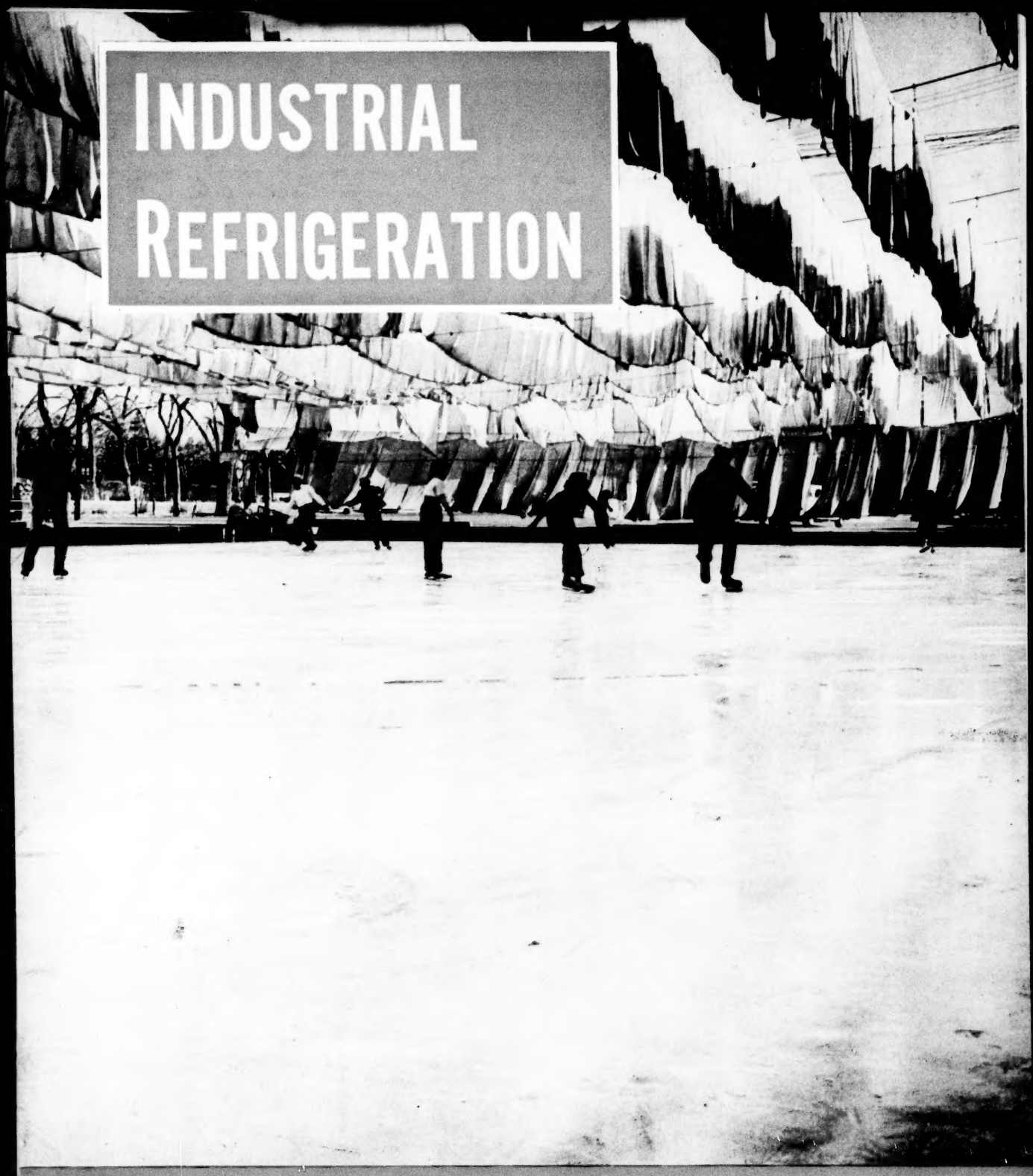
INDUSTRIAL REFRIGERATION



Formerly Ice and Refrigeration

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Food Preservation With Use of Irradiation . . . . . Page 17
Modern Ice Plant Provides Ice for Car Icing . . . . Page 26
Role of the Shift Engineer in a Modern Brewery . . Page 34

JULY, 1954

HOW TO KEEP COMPRESSOR SYSTEMS CLEAN

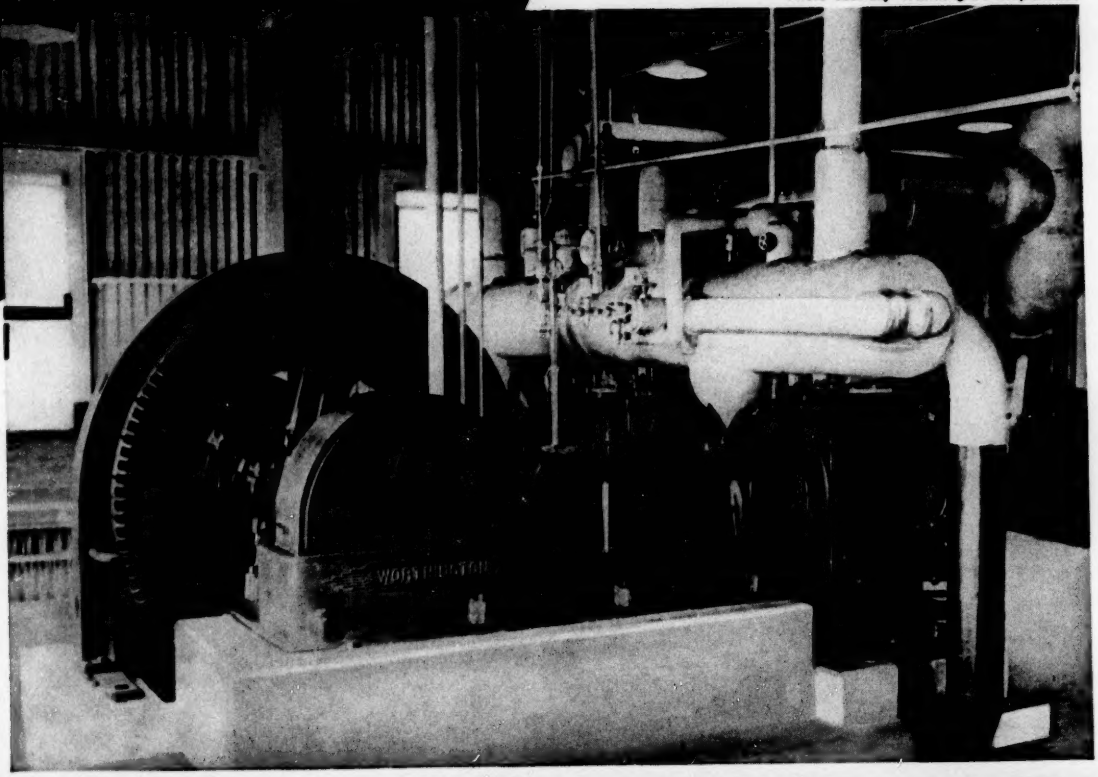
YOU CAN best assure clean, efficient, economical compressor performance by keeping wax out of the system. Use *Texaco Capella Oil (Waxfree)* – the oil that *won't precipitate wax* in systems even at temperatures as low as minus 100° F.

Texaco Capella Oil (Waxfree) is highly refined and has outstandingly low haze and floc temperatures. You'll also like its high resistance to oxidation and the fact that it is moisture-free and compatible with all refrigerants.

You can get *Texaco Capella Oils* – a complete line of them to meet all requirements – in 55-gallon and 5-gallon drums, 1-gallon cans, and the more widely used grades in 1-quart containers. All are refinery-sealed to protect purity and quality.

A Texaco Lubrication Engineer will gladly help you select the proper oils for your compressors. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Photo courtesy Worthington Corporation



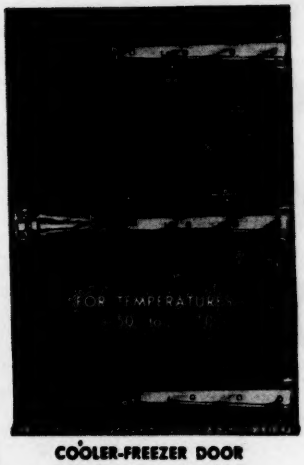
TEXACO

TEXACO Capella Oils (Waxfree)

FOR ALL REFRIGERATING AND AIR CONDITIONING COMPRESSORS

UPPER CORNER CONSTRUCTION

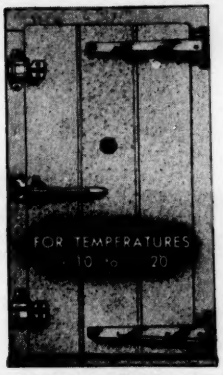
LOWER CORNER CONSTRUCTION



COOLER-FREEZER DOOR
- Modern streamlined job
- 100% "Douglas Fir"
- Sanitary hardware

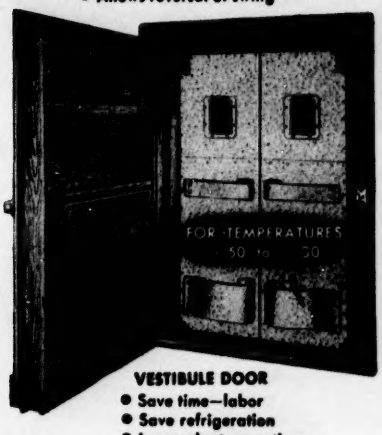
X-52 PLYWOOD PANEL DOOR
- Plywood front and back
- Extra heavy-duty hardware
- Special type gaskets

- Maximum insulation fill
- Most possible rigidity
- Allows reversal of swing



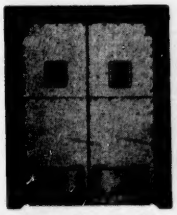
LOW TEMPERATURE DOOR
- Entire metal-clad front
- Extra heavy-duty hardware
- Special type gaskets

SUPER FREEZER (OVER-LAP) DOOR
- Extra-heavy construction
- Extra-heavy duty gaskets
- Extra heavy-duty hardware

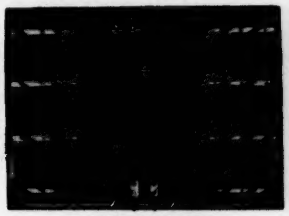


VESTIBULE DOOR
- Save time—labor
- Save refrigeration
- Large plant operation

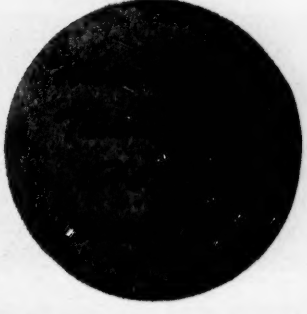
TRACK DOOR
- For abattoirs
- Meat handling rails
- Banana rooms



AUTO-CLOSE DOOR
- For loading dock
- Intra-cooler doors
- Heavy trucking



DOUBLE DOOR
- For palletizing
- For carloading
- For elevator shafts



BUTCHER BOY REFRIGERATOR DOOR CO. • HARVARD, ILL.

Cut Refrigeration POWER COST

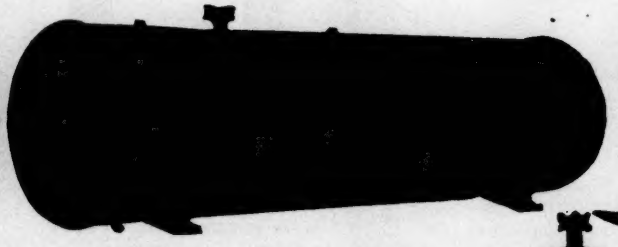
Write for Bulletin BC-3

And boost tonnage with Vogt BRINE COOLERS

MULTIPASS TYPE

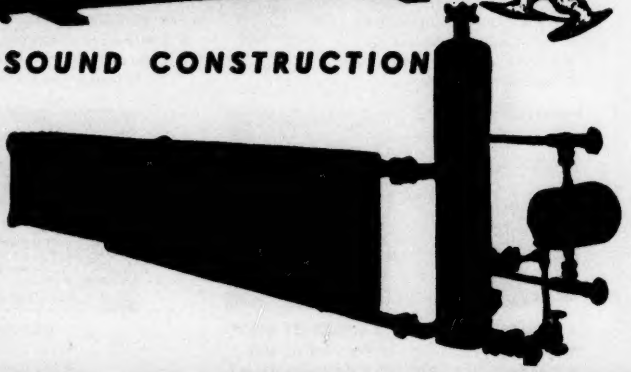
MAXIMUM EVAPORATING SURFACES

SINGLEPASS TYPE



CORRECT DESIGN — SOUND CONSTRUCTION

COIL TYPE



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Branch Offices: New York · Chicago · Cleveland · Philadelphia · Dallas · St. Louis · Charleston W. Va.

LETTERS

(Letters to the editor are welcome from readers of INDUSTRIAL REFRIGERATION on any subject of general interest.)

Finest in its Class

Olympic, Wash.

Your magazine is rated among the finest periodicals in its class. We wish you continued success. And thank you for requesting the shift engineer story.

SCOTT OLMSTEAD
Olympia Brewing Company

NARW Officers

IN THE report of the annual convention of the National Association of Refrigerated Warehouses in the June issue of INDUSTRIAL REFRIGERATION, a number of errors were made in the list of officers for 1954. The complete list is as follows:

President, M. W. Young, San Francisco, Calif.

Vice-President, F. D. Newell Jr., Minneapolis, Minn.

Treasurer, John K. Dozier, Houston, Tex.

Executive vice-president, Wm. Dalton, Washington, D. C.

Secretary, Joseph Colquitt, Washington, D. C.

Executive Committee: M. W. Young, San Francisco, Calif.; F. D. Newell, Jr., Minneapolis, Minn.; John K. Dozier, Houston, Tex.; Charles E. Adams, Jersey City, N.J.; Richard Doncaster, Holley, N.Y.; Charles L. Henry, Atlanta, Ga.; R. C. Muckerman, St. Louis, Mo.; Edwin M. Neylon, St. Louis, Mo.; A. W. Oakley, Jersey City, N.J.; William E. Ready, Indianapolis, Ind.; Gilbert J. Stecker, Louisville, Ky.; E. F. Swanberg, Seattle, Wash.; J. W. Wilkerson, Kansas City, Mo.; R. M. Conner, Chicago, Ill.

Reaching The Downtrodden

FROM a report supposedly written by a Communist Party organizer to his superior: "It is becoming increasingly difficult to reach the downtrodden masses in America. In the spring they're forever polishing their cars; in the summer they take vacations; in the fall they go to the world series and football games. And in the winter you can't get them away from their television sets. Please give me suggestions on how to let them know how oppressed they are".—WALL STREET JOURNAL

Industrial Refrigeration

formerly **ICE AND REFRIGERATION**

Now in its 63rd Year of Publication

J. F. NICKERSON, FOUNDER

Vol. 127 **July, 1954** **Number 1**

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The Cover:

The Denver Country Club Outdoor Skating Rink is sheltered from the penetrating rays of the sun with specially made overlapping shades eight feet wide and securely anchored. It is operated as an outdoor attraction five months of each year. See story on page 22.

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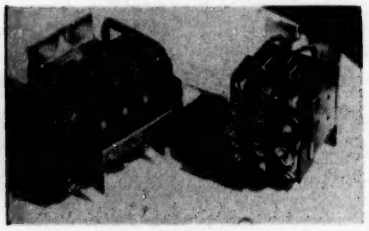
What's New

MACHINERY
APPLIANCES • PROCESSES

New Starters Designed For Air Conditioning

A NEW line of magnetic, across-the-line starters and contactors designed specifically for the air conditioning and refrigeration industries is announced by the Arrow-Hart & Hegeman Electric Co., Hartford, Conn. Specially engineered for use with refrigeration compressor motors, these controls are the result of research and work in close cooperation with leading refrigeration and air conditioning engineers. The operating mechanism is a special, designed-for-the-purpose control. This design is reputed to make possible radical reductions in size combined with increased operating efficiency.



New Magnetic Starters

To provide the special tripping characteristics required by hermetically sealed motors for protection against burnout, the controls can be equipped with Type "QT" quick trip heaters. These quick trip heaters and standard heaters both fit standard overload relays and require no special equipment such as spindles or non-standard relays. One size of control, it is pointed out, will cover practically all installation needs.

Extruded Tape Sealer Announced by Presstite

A SEALING tape or bead with a string reinforcement core, furnished in easy-to-use tape form, has been announced by Presstite Engineering Co., St. Louis. The flexible, moldable tape No. 161.1, will not sag or string out. It has excellent adhesion on both sides, making it ideal for sealing under metal trim, between aluminum lap joints, under metal flanges, and for setting and sealing glass in metal frames or channels. Odorless, non-shrinking and non-hardening, the black sealer retains its shape and softness from minus 30 F to 200 F.

No. 161.1 is another of many Presstite sealing tapes ranging from white to black, resistant to temperatures varying from 375 to minus 70 F, unaffected by oil, gas, water or water vapor, and furnished in extruded beads, tapes, and ribbons.

New Insulation Finish

A NEW insulation finish, called Monoplast, that may be trowelled on in one coat to provide a clean, light-reflecting white finish through the entire range of refrigerated room temperatures down to 80 F. below zero, has been developed by the Armstrong Cork Company Low Temperature Insulation Department. The new finish is available for cold storage applications only through Armstrong's Contract Service.

Monoplast applied with a steel plasterer's trowel. The light reflective surface is easy to keep clean with soap and water, or any normal cleaning agent.

Monoplast provides a finish for cold room interiors that improves their appearance, brightens them, and is easy to maintain. The new material is applied in a single coat to corkboard and no scoring, painting or additional finishing is required. In addition, since it weighs only about one-fifth as much as a two-coat portland cement plaster finish, Monoplast may be trowelled to ceilings, as well as walls, without use of metal lathe, hexagonal mesh wire, netting, or any other support.

Monoplast dries to a resilient finish that protects insulation from abrasion. It will withstand 80 F. below zero without cracking, crazing, or becoming brittle and chipping off the wall and ceiling. Since there are no flammable solids in Monoplast, there is no fire hazard during installation and when dry, the material is classified as a fire retardant. It will not support combustion. There is no odor when it dries and only a slight odor as it is being applied. When it is firmly set, the finish can be cleaned by washing with soap or any other normal cleaning method.

Barricade Prefabs For Rail Car Doors

A NEW development in strapping technique which offers savings in shipping costs and reduction of car door damage to shipments, is offered by the Signode Steel Strapping Co., Chicago, Ill. Jamming at car doorways has been one of the principal sources of product loss in transit. This new method, the retaining strip, a prefabricated barricade of heavy, waterproofed kraft paper laminated over two bands of steel strapping, is 18 inches wide and 88 inches or 108 inches long. Visible nail holes simply nailing of these strips, making them fit snugly against doorposts, filling the gap and keeping the loading from side shifting into the doorway.

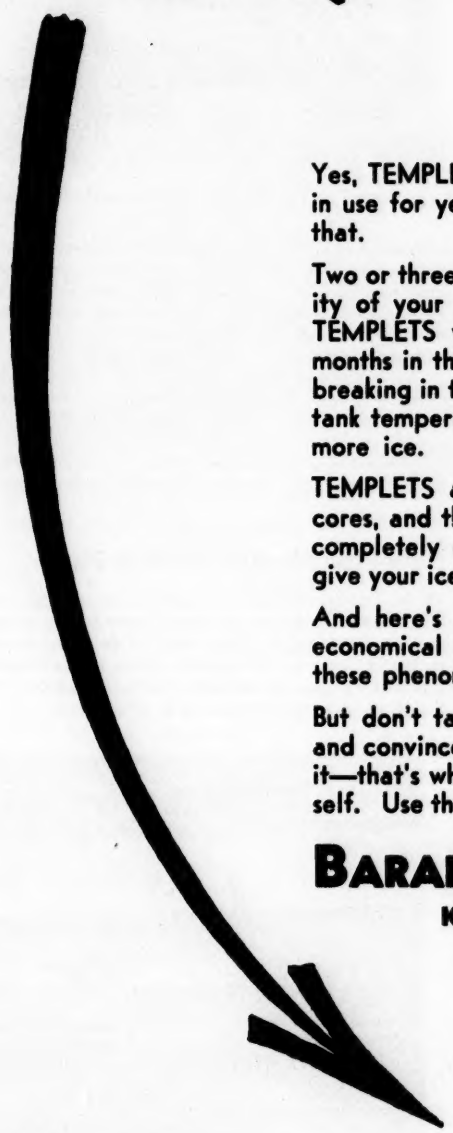
Duplex Strips draped out of the way during loading are tensioned and sealed with a Signode stretcher and sealer.

Two types of strips are offered; standard and duplex. The duplex are made to be split in the middle and draped back against sides of car while loading. Then, ends are brought together, tensioned and sealed. Standard strips are used on both off-doors and loading doors for many loads.

Tank Capacity Computer

A NEW slide rule type computer supplied by the Hauser-Stander Tank Company, Cincinnati, Ohio gives quick answers to tank capacity problems. It will show at a glance capacity of round or rectangular tanks. In reading capacity of round tanks, one sets arrow over diameter and reads gallons over depth figures. The same procedure is followed in reading capacity of rectangular tanks setting length under width and reading gallonage over depth. Production men concerned with tank capacities can have one of these computers simply by requesting it.

Rx { *Here's a prescription that will enable you to make better ice... faster!*



Yes, TEMPLETS—the famous little green tablets that have been in use for years in ice plants all over the country—will do just that.

Two or three TEMPLETS dissolved in a can will improve the quality of your ice and leave no taste, no odor, no color. With TEMPLETS you can make more ice during the peak summer months in the same number of cans. They reduce cracking and breaking in the cakes, so you can freeze raw water at lower brine tank temperatures, thus using your cans more often and making more ice.

TEMPLETS also produce a clearer cake. White butts, heavy cores, and the cloudy veil that your customers don't like can be completely or partially eliminated by using TEMPLETS. They give your ice a finish and polish.

And here's something else you'll appreciate. TEMPLETS are economical in price. For only about 1c per ton you can use these phenomenal tablets.

But don't take our word for it—try TEMPLETS at our expense and convince yourself of their value. They're good and we know it—that's why we offer a free sample so you may convince yourself. Use the coupon below.

BARADA & PAGE, INC.

KANSAS CITY, MISSOURI

Send This Coupon For Your FREE Sample Today!

B&P

Barada and Page, Inc.
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Kansas City 20, Missouri

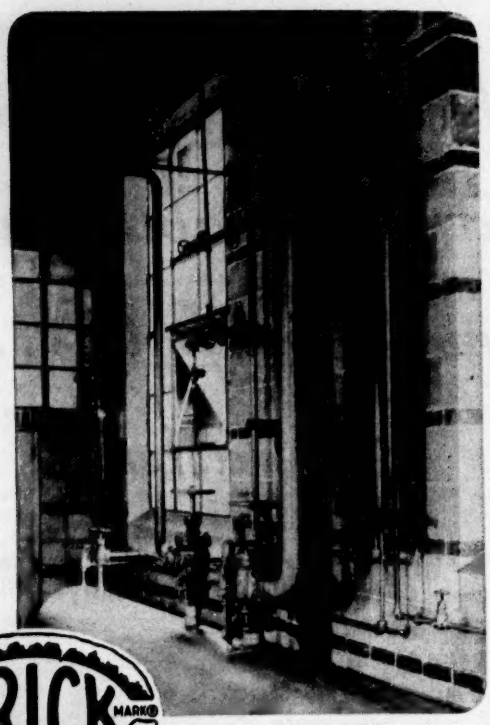
Please send me a free sample and literature on TEMPLETS.

Name .....

Company .....

Address .....

City ..... State .....



TRADE FRICK MARK®

ELECTRONIC PURGERS PAY FOR THEMSELVES . . .

Engineers have for years relied on purgers for removing air and other non-condensable gases from refrigerating systems.

Ammo. Head Pressure	Brake Hp. per Ton Refrig. 5 Lb. Suct.	15 Lb. Suct.	25 Lb. Suct.
215	2.48	1.85	1.52
205	2.42	1.78	1.47
195	2.36	1.72	1.41
185	2.3	1.66	1.37
175	2.22	1.61	1.32
165	2.15	1.57	1.27
155	2.1	1.50	1.21

Worthwhile savings in horsepower are made by reducing head pressure with a purger.

Larger plants find that automatic purgers save labor as well as power and refrigerant. If you operate an ammonia system of considerable size, check into the merits of the Frick Electronic Purger. Write for Bulletin 199-A, featuring this better automatic equipment.

DEPENDABLE REFRIGERATION SINCE 1882

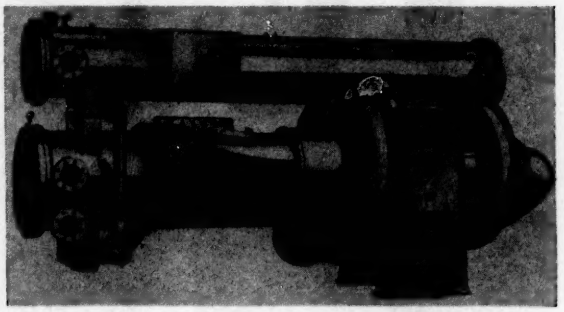
FRICK CO.

WAYNESBORO, PENNA. U.S.A.

New Equipment—Continued

Water Chillers For Air Conditioning

THREE larger size CenTraVac water chillers for comfort or process air conditioning have been introduced by The Trane Company, manufacturers of air conditioning, heating and ventilating equipment. With the additional units the line now includes eight sizes from 45 to 400 tons capacity.



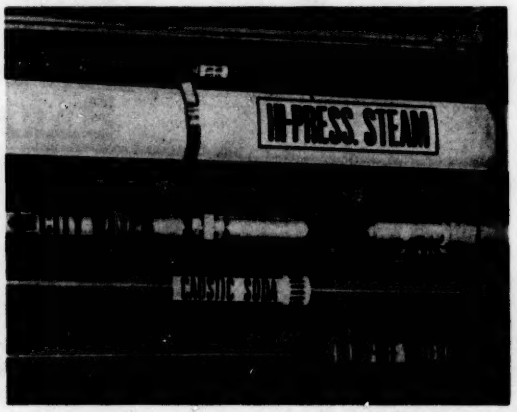
Cen-Tre-Vac Water chiller made by Trane Co.

Trane CenTraVacs incorporate a hermetic centrifugal compressor that automatically matches power consumption to load variations from 100 per cent to 10 per cent of compressor capacity. Power input is limited to actual cooling requirements, reducing power costs. The CenTraVac starts, stops and runs automatically with the controls interlocked for added safety.

The compressor motor is hermetically sealed inside the casing, eliminating need for shaft seals and consequent shaft seal maintenance and possible loss of refrigerant through the seal, according to The Trane Company. The compressor is direct drive type. Elimination of gear box or belt drive results in further power savings, it is claimed. It can be installed without special bases.

New Pipe Markers Stick to Pipe

AN IMPROVEMENT in their line of Self-Sticking Pipe Markers, which makes them unaffected by extreme temperatures of the pipes to which they're applied, is announced by W. H. Brady Company, Milwaukee. These pipe markers, they claim, will stick to pipes at continous temperatures from −300 to +300 F and intermittent temperatures to 450 F.

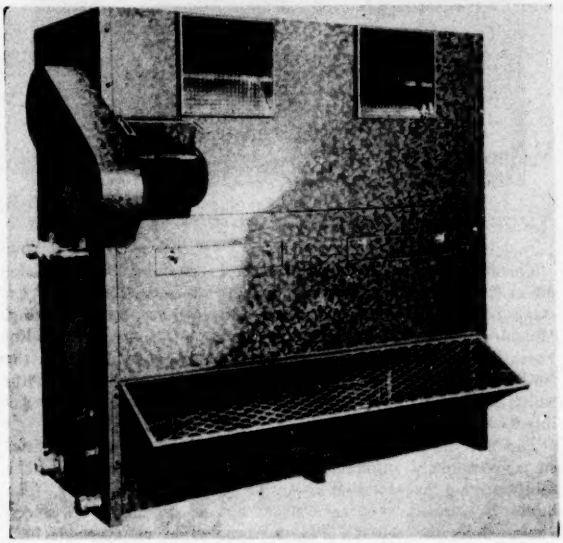


Examples of Uses for Brady Pipe Markers

The Markers come mounted on handy dispenser cards for quick application. The dispenser cards themselves are treated with coating which gets the Markers off the Card fast, smooth and distortion free.

ACME Cooling Towers Have Increased Capacity

AS A result of research and development work, Acme Industries, Inc., Jackson, Michigan, has considerably increased the capacity and overall efficiency of the larger units in their cooling tower line. With an average increase in efficiency of 15 per cent over previous models, the new HACT Series Towers provide a range of capacities from 20 through 70 tons. (Flow Cold Tower models, 3 through 15 tons.) Larger capacity has been accomplished without increasing the compact size of the previous models and without any advance in price. Improvements in eliminator efficiency and in the design of fans and fan shafts figure in the change.



The new HACT Acme Cooling Tower

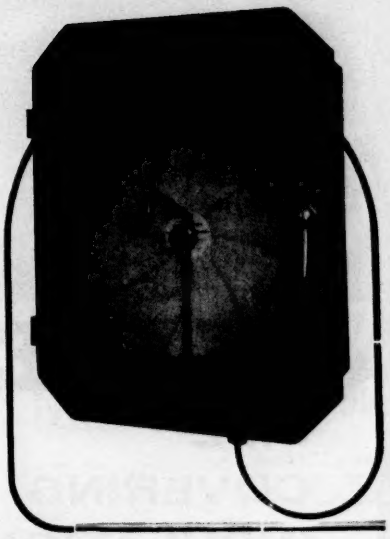
Acme Cooling Towers solve the increasing problem of providing the water for air conditioning and refrigeration systems wherever water is scarce and/or water or sewage rates are high. Savings in water consumption of 95 per cent are achieved through the re-use of water cooled by these towers.

Heavy-duty, all-metal construction, with all sections hot-dipped galvanized after fabrication, it is claimed, makes Acme Cooling Towers proof against deterioration under any conditions over a long operating life. These pre-assembled, packaged units are completely piped and have motors for either indoor or outdoor service integrally mounted. Installation work and costs are minimized. The newly-designed centrifugal-type fan wheels, cadmium plated solid steel shafts and over-size ball bearings, plus the rigidity of the die-formed structural panels, make for smooth, quiet operation and a minimum of maintenance. Scientific arrangement of the non-clogging low pressure-drop brass spray nozzles and the effective design of the baffles in the all-steel Acme-Pak produce a continuous transfer of heat from the water circulated through the tower and provide the maximum cooling effect.

First Aid Kit For Ammonia Burns

A NEW first aid kit developed especially for the treatment of ammonia burns has been announced by Mine Safety Appliances Company, Pittsburgh, Pa. A spokesman for the firm said decision to develop the new "Anhydrous Ammonia First Aid Kit" was based on numerous requests from users of anhydrous ammonia.

The new kit contains necessary materials for treatments, including gauze bandages and pads, antiseptic swabs, eye dressings, bandage scissors, eye cup, plastic bottles of acetic acid, sodium thiosulphate and boric acid solutions, and a special instructions and contents sheet.



Gets the Story inside out!

A Taylor Recording Thermometer gives you an accurate, continuous report of temperatures *inside* your locker or cold room, from a convenient point *outside* the room. You have a permanent, indelible, degree-by-degree, seven-day temperature record from the instant the instrument is put in operation.

Here's protection for you, in the irrefutable evidence of temperature maintained, in case of damage claims: protection for your customers, who can assure themselves at a glance that their foods and other perishables are kept safely.

Thanks to Taylor's exclusive Accuratus connecting tubing, the instrument may be placed as far as 100 ft. away from the highly sensitive temperature bulb, without effect from the varying temperatures through which the tubing passes. The case is moisture proof and corrosion resistant. 12″ charts, graduated in degrees and hours, can be changed in a matter of seconds.

For full information on this and other Taylor refrigeration control systems, consult your Taylor Field Engineer, or write for **Catalog 300.** Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

OZITE
PIPE
COVERING
INSULATION
GIVES

More Elbow Room!

OZITE All-Hair felt lasts a lifetime . . . applies without waste . . . is easy to install for curves, straight pipes or valves . . . renders low conductivity for efficient heat barrier . . . allows close temperature control . . . provides maximum capacity of refrigeration units. . . cuts power consumption.

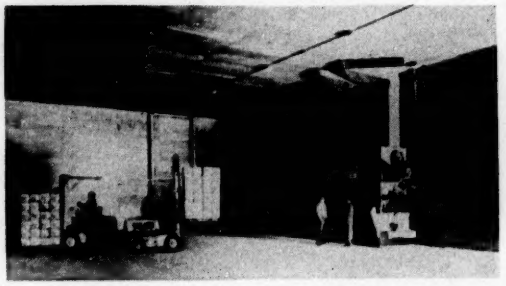
Get the facts about time-proved OZITE.
Write for 4-page Bulletin #300.

NO SHAPE IS TOO COMPLEX

AMERICAN HAIR & FELT COMPANY
MERCHANDISE MART • CHICAGO 54, ILLINOIS

No-Frost Concentrator For Low Temperature Rooms

AN IMPROVED No-Frost system for operating ice cream hardening rooms at low temperatures is announced by the Niagara Blower Company, New York. The system uses fan spray coolers to chill and distribute the air at minus 15 F or minus 20 F. A new type of No-Frost Liquid Concentrator disposes of the moisture that in conventional methods results in the icing of cooling coils.



Niagara Blower No-Frost Concentrator Installation

The fan spray cooler, located in the hardening room, circulates air at the required temperature, keeping the room conditions constant because there is never any interruption for defrosting. Moisture is kept from freezing by the action of the Niagara No-Frost Liquid spray. As moisture accumulates (and dilutes the No-Frost solution) the liquid is pumped to the concentrator which is located outside the room. Here the moisture is evaporated and dissipated out-of-doors.

The new model concentrator, designated as Type A, operates on a completely different principle from older models. The solution is no longer raised above the boiling point of water. The liquid is warmed, then sprayed in an air stream at low speed (induced by the sprays) and then cooled in an air-to-air heat exchanger which condenses the No-Frost liquid and separates it from the moisture laden air. The No-Frost Liquid is then returned to the cooling system. The equipment is manufactured in a range of capacities adaptable to hardening rooms of any size.

Automatic Doors Save Refrigerated Air

TO CUT down on the loss of expensive conditioned air required in refrigerated warehouses and cooling rooms, and at the same time speed up the flow of men and materials, controls for doors are now available that can accomplish both these results, accord-

Automatic Door for Refrigerated Warehouse

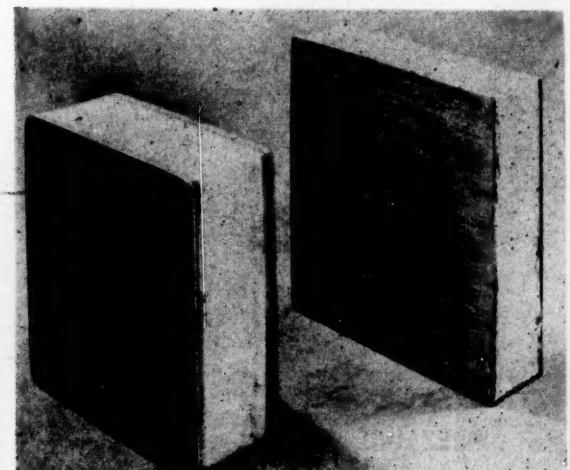
ing to the Magic Door Division, The Stanley Works, New Britain, Conn.

Doors equipped with Magic Door Controls automatically open without being touched, stay open as men and materials pass through, and then close when the passageway is clear. By adding a Bell Crank Lever attachment to the controls, refrigeration doors will shut tightly, thus maintaining desired humidity and temperature conditions, and will still open automatically when activated. The door is closed against the frame with a pressure of 150 pounds per square inch or more, effectively eliminating waste of conditioned air. The lever attachment's force is applied to the center of the door to equalize pressure around the perimeter.

To permit automatic operation, the latching device of the door is made inactive and it can be kept closed during the night by the pressure of the operator, or where desired, the operator can be shut off and the door kept closed by the latch until the next work day. These operators are usually installed over refrigeration doors, and can be controlled by pull cords, push buttons or floor plates. The interval during which the operator holds open the door can be adjusted to meet specific requirements.

Koppers Develops Foam-Type Insulation

MAN-MADE plastic pearls which, like popcorn, burst themselves into light, fluffy, snow-white masses when heated in containers, are about to open a new field to the plastic industry. An improvement on the foam-type plastics which heretofore could be processed only in sheets or blocks, the new material developed by the Research Department and Chemical Division of Koppers Company, Inc., can actually be "popped" into various shapes and sizes in heated molds in a single operation. As produced by Koppers, the new material is in the form of tiny, hard beads of the plastic, polystyrene, impregnated with a special foaming agent that reacts under heat somewhat like the moisture within a kernel of popcorn.



Sandwich construction to combine lightness and strength is possible with Koppers new expandable Polystyrene Insulation. Here pieces of the featherweight plastic are sandwiched between plywood (left) and aluminum (right). The plastic adheres readily to wood and metal.

Dr. G. F. D'Alelio, vice-president and manager of Koppers Research Department, said the new material has certain properties and qualities which will make it useful in many fields. Tests indicate that the material has better insulating properties than many insulations. Its moldability should make it desirable for industrial uses, such as in refrigerator door liners which have to be shaped.

Low water absorption is another feature of the new plastic material. Tests indicate less than one-half of one percent absorption by volume in one week of immersion.

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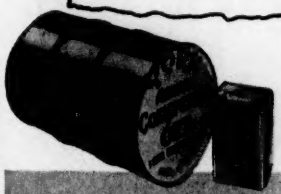

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PRESS BRIEFS

Hoffberger Takes Over Terminal Refrigerating & Warehousing Corp.

MORE than 75 percent of the stock of the 84-year-old Terminal Refrigerating and Warehousing Corporation, Washington, D. C., has been purchased by Merchants Terminal Corporation of Baltimore, Md. The price was around $750,000.

The Washington company with plants at 11th and E Streets S.W., and Fourth and D Streets, S.W., was officially taken over May 26 by members of the Hoffberger family, which has controlled and operated the Baltimore firm for 80 years. Sol Hoffberger is president of Merchants Terminal.

There will be no change in operating personnel of the two Terminal Refrigerating plants and the company will retain its individual corporate entity, it was learned. All officers headed by Clarence F. Norment, Jr., resigned, however. No official announcement was forthcoming from the Baltimore Company pending a meeting of the board of directors.

The Hoffberger family interests made an offer of $50 a share for Terminal Refrigerating shares on April 30 through Y. E. Booker, Washington resident partner of Alex, Brown & Sons.

The buyers reserved the right to withdraw the offer if less than 80 percent of the shares was tendered. This stipulation later was waived and it was learned that the buyers had acquired more than 75 percent or more than 14,925 shares of the 19,906 shares outstanding.

Terminal Refrigerating has around 2.5 million cubic feet of refrigerated storage space at its two plants at Washington. Merchants Terminal has 2.5 million cubic feet in a big new plant at nearby Landover, Md., and another 4 million cubic feet in Baltimore.

Total space of the two companies will exceed the total of any other company on the eastern seaboard with one exception in New York.

Eugene G. Hurst will continue as manager of the Eleventh Street plant and Alfred F. Warner will remain as manager of the Fourth Street plant. Larry Burns will continue to manage Merchant Terminal's big refrigerated storage warehouse at Landover, Md.

Ice Cream Charges Denied

EIGHT major ice cream manufacturers and 55 of their subsidiaries have denied charges of using unfair methods of competition to divert business from other producers. The Federal Trade Commission charged recently that the companies and their subsidiaries had tried to divert business by supplying ice cream cabinets to dealers, making loans and performing other services for retailers. The eight major companies are:

The National Dairy Products Corporation and the Borden Company, both of New York; the Arden Farms Company and the Carnation Company, both of Los Angeles; the Beatrice Foods Company of Chicago, the Fairmont Foods Company of Omaha, the Pet Milk Company of St. Louis and Foremost Dairies, Inc., of Jacksonville, Fla.

These companies do about 40 percent of the nation's ice cream business, the F.T.C. said. The following hearing places and dates were tentatively set in the case: National Dairy, in New York on June 8; Borden, in New York on June 9, and Carnation and Arden Farms in Los Angeles on June 28.

Research in Radiation Sterilization of Foods

CONTRACTS for research into radiation sterilization of food have been or are about to be awarded to several institutions by the Army Quartermaster Corps, under its stepped-up, five-year program of research in this field. The institutions include the American Meat Institute Foundation; Hormel Institute; Iowa Agricultural Experiment Station; Massachusetts Institute of Technology; Ohio State University Research Foundation; Oregon State College; Columbia University; and the University of Michigan. These institutions were previously doing the same type of work under the Atomic Energy Commission, whose programs have been discontinued.—Cold Facts.

American Air Filter Purchases Ice Cooling Appliance Corp.

THE entire plant and equipment of Ice Cooling Appliance Corporation, Morrison, Ill. has been purchased by the American Air Filter Company, Inc. W. M. Reed, president, revealed. Ice Cooling Appliance Corporation, a subsidiary of City Products Corporation, Chicago, Ill., manufactured ice refrigerators, freezers, soft drink coolers, and vending machine parts.

The 152,000 square foor Morrison plant will be operated by AAF's Herman Nelson Division, Moline, Ill., which produces heating and ventilating equipment for schools, industrial, commercial and institutional buildings, as well as special portable heaters for Arctic Air Force bases, Mr. Reed said.

Michigan Growers Lease Fruit Packing Plant

A New processing firm, formed by four Eau Claire, Mich., growers, has leased the cold storage plant and packing house of the Eau Claire fruit exchange and will begin frozen fruit packing operations with the strawberry season. The firm, named Silver Mill Frozen Foods, Inc., also has a purchase option for the facilities.

D. Dorr Dean, a Berrien Springs grower and general manager and secretary-treasurer of the firm, said the company intends to increase the volume of fruit packed above the pack put up annually by the fruit exchange. President of the new corporation is Henry Prillwitz, Jr., of Eau Claire.

Suit Names Ice Dealer

THE City of Paragould, Ark. has filed suit against R. H. Hunter, doing business as the Paragould Ice Co., seeking judgment for $4,128.43 under a contract assigned to the city by the Missouri Utilities Co. when the city purchased the company's properties Dec. 15, 1952.

Under the contract, entered into December 18, 1950, by Mr. Hunter and H. B. Newman, president of the utilities company, Mr. Hunter was to pay $1.00 per ton for ice sold in the Paragould area in return for ice selling rights, the complaint said. The Missouri Utilities Co. also formerly made and sold ice in Paragould.

Seeger Enlarges Plant

THE Seeger Refrigeration Co. St. Paul, Minn., will spend $2,200,000 to double the capacity of its refrigeration compressor plant in Evansville, Ind. Walter Seeger, chairman has announced. The money will be used to add production machines and equipment to manufacture home freezer units, he said.

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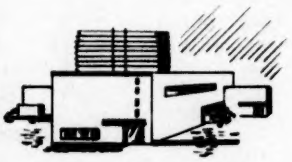

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In the Spotlight

FROST HEAVING of ground floors in cold storage plants is a problem in many refrigerated warehouses, particularly when freezers are next to the ground. The use of insulation as an aid in meeting this problem is discussed in the article on page 15. However the point is made that each operation requires its own individual study by trained and experienced engineers.

THE PRESERVATION of foods by irradiation, the progress of this new Technology, and its possible effect on refrigerated storage is a subject of much interest to refrigerated warehousemen. Whether it provides a means of preserving foods not under refrigeration or whether it may have wider utilization in extending the life of foods in refrigerated storage is a question. The various facets of the process and its possible effect on refrigerated storage is described in the article starting on page 17.

REFRIGERATED CARGO service recently was inaugurated by the Three Bays Line from Miami to Latin American countries, with three refrigerated ships making regular direct sailings. Any desired temperature can be maintained independently in each of the three holds. For description of the new service and refrigeration details see article on page 21.

AN ICE SKATING RINK located outdoors in an open structure in Denver, Colorado, is shaded with specialty constructed shades to protect the ice from the hot winter sun of Denver. It also has complete refrigerating equipment to keep the floor in constant shape for skating five months out of the year, and for ice shows and hockey games. See article with description and pictures page 22.

VACUUM PRECOOLING of lettuce and other fresh vegetables is making a great appeal to California shippers. It is now available to shippers at all Imperial Valley shipping points. In production for the first time this year, the modern vacuum precooling plant of The Shippers Service Company, El Centro, with 21,000 square feet of floor space, is described with pictures, in article on page 23.

AN ICE MAKING plant to provide ice for re-icing shipments of vegetables and fruits and refrigerator cars has been completed at Erwin, Tennessee by The Harmon Ice & Coal Company for the Fruit Growers Express Company. A description of this plant, with pictures is presented in the article on page 26.

ANNUAL REPORT of the Refrigeration Research Foundation reviews the work accomplished since the organization of the Foundation ten years ago — in 1943. This ten years of research, it states, has made obvious the changing techniques, including very pronounced trends toward lower temperatures. A summary of the report starts on page 29.

THE SHIFT ENGINEER in a brewery has a big job. No matter how automatic a refrigerating plant may become, or what new shortcuts science may devise, in the complex brewing process there will always be a need for many skilled hands. This is emphasized in the article on page 34 on the engineer's job in the Olympia brewing plant, Olympia, Wash.

THE NAPRE annual convention to be held at New Orleans November 2-4 is making elaborate plans to keep the ladies entertained while the men are in the business sessions. Further details of these plans are revealed on page 42.

MANY MORE readers are participating in the QUESTION BOX section of NAPRE. Prof. H. G. Venemann has picked out additional answers received on six recent questions, and they are published (Page 38) in lieu of answers to the June questions. Vapor binding of liquid ammonia pumps brought in three worthwhile answers and another sketch; more questions and answers on silicones; more data on increasing ice cream hardening capacity with rotary booster, compressor, etc. Answers to June questions in the August issue.

THE APPLICATION of refrigeration in industry has expanded with the growing need for precision and speedy production, brought about by the tremendous growth of manufacturing in America since the beginning of this century. An indication of the uses of refrigeration for these varied purposes are told in an article which will be published in the August issue, from reports by refrigerating machinery manufacturers.

OTHER ARTICLES to be published in future issues of INDUSTRIAL REFRIGERATION will include a variety of subjects of interest to engineers and refrigeration men generally. Among these are: The production of dry ice in text and pictures; The new air conditioned bus terminal in Chicago; How refrigeration has helped develop the new aluminum alloys necessary in construction of the new strato jet bombers.

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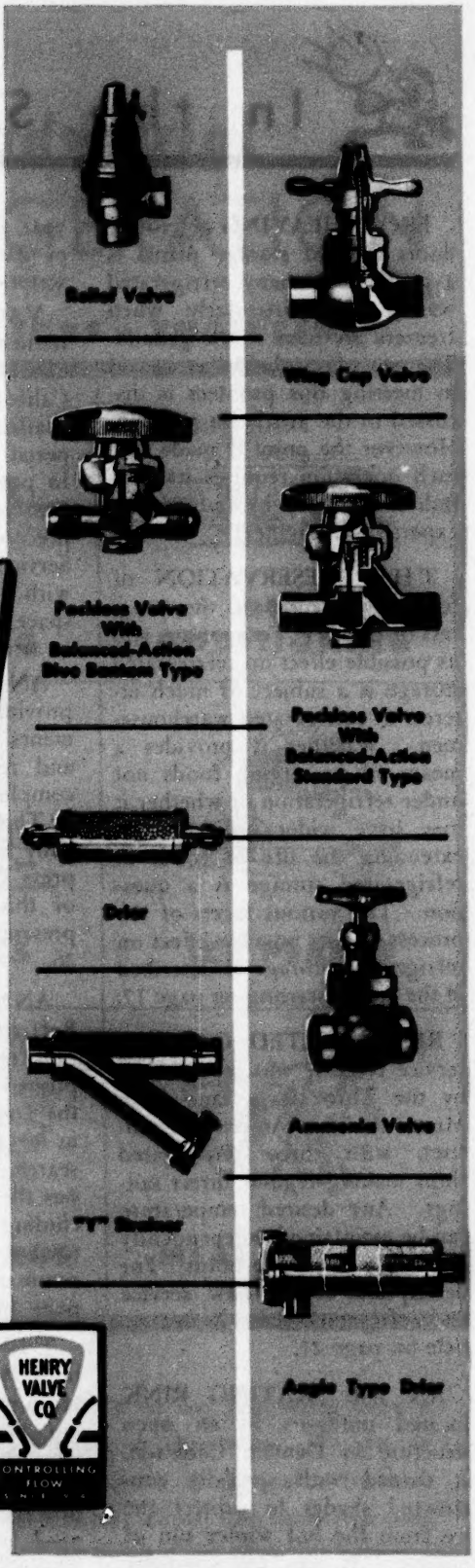

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Will Insulation Prevent Frost Heaving of Cold Storage Ground Floors?

JAMES A. CALLENDER
Consulting Engineer
Seattle, Wash.

SHOULD we, or should we not, place conventional insulation in ground floors of our new cold storage plants, and if so, how much? The floor is on the ground, earth is an insulator, there is plenty of it, and it comes without extra charge along with the site selected for the plant.

An owner decides to build a plant without conventional floor insulation because one in the neighboring state was so built and is still operating successfully. After several months, or years, his floor and building supports rise, the insulation and vapor seal breaks, the roof leaks, the building cracks, piping breaks, the plant has to be shut down, the product moved elsewhere, and expensive repairs are required. What happened? Ice and its irresistible force of expansion has formed under the floor.

Heaving Not Uncommon

The heaving and breaking of cold storage floors, and the damaging of buildings is not uncommon. This is particularly true where cooler rooms have been changed to low temperature storages, and in other refrigerated buildings where improper or no study was given to under-floor construction. Under ice conditions, floors and interior columns have raised 8 to 14 inches before refrigeration was discontinued. The floors may, under certain conditions, sink below constructed levels after the ice has been melted.

Soil Mechanics Important

The problem involves the behavior of the many types and combinations of types of soil, together with the many different moisture conditions. While soil is one of our oldest materials, soil mechanics is one of our newest studies. Engineers and scientists are bringing much new knowledge to us through constant research and experiment. The insulation value of soil under the floor depends entirely on the soil characteristics and the amount of moisture present.

In this period of high taxes, continually rising labor costs, and moderate power rates, investors planning new cold storage plants and their consulting engineers are constantly seeking ways and means of constructing the most economical plant, balancing operating costs, insurance costs, and capital investment.

We know, that with the exception of specialized cases, such as distribution centers in heavily populated areas, high single story buildings, either at railroad car door and truck level (or at ground level, on large relatively cheap areas of land) with mechanical handling, is a must. In many cases with lift trucks, pallets, and dollies, cars and trucks may be loaded and unloaded as cheaply from ground level as from car door level, and considerable cost may be saved on the storage structure.

Normally, present day floors are carried by the ground. Structurally supported floors carrying product weighing 400 to 600 pounds per square foot, up 20 feet and higher, are just too expensive. Insulation in these floors should give the least possible deformation under lift truck loadings. In rooms of any temperature, whether the floor is insulated or not, product should be carried on pallet boards or racks to allow air circulation on all sides of the product.

High Temperature Floor Insulation Uneconomical

The placing of conventional insulation in floors of high temperature storage rooms, 27 F. and above, resting on normal dry soil is not economical, if proper details are carried out in the construction.

The floors of buildings in the 10 F. and lower temperature class are entirely a different matter. The amount of insulation used in these floors should be governed by the insulation characteristics, the room and ground temperatures, the water or water vapor present or available to the soil under the building, the soil and subfloor characteristics as to the transmission of heat and water, the availability and cost of underfloor heat, type of operation, type and shape of the building, and costs of operation versus costs of insulation.

In the hypothetical case, wherein normal soil is perfectly dry, and

Fig. 1 — Air for ground heat is taken from warm engine room near ceiling at Skagit, Washington, cold storage plant and forced through tile grid under floor by axial vane fan and duct work.

Fig. 2 — Grilles vent ends of six-inch concrete drain tiles on six foot centers, fed warm air by fan pictured in Fig. 1. Plant is the Skagit Cold Storage Mt. Vernon, Wash.

where there is no water or water vapor available to be attracted to the area under the floor, either through differential pressures or capillary attraction, no conventional insulation or outside heat is required, regardless of room temperature. Normal soil is practically inert throughout the range of temperatures we are discussing, if perfectly dry. In this category may be included the case wherein there is a small amount of water vapor, and the soil and floor conditions are such that the vapor is carried directly from its source through the earth and floor to the refrigeration coils without the formation of ice and its dangerous expansion.

If a cold storage plant was constructed on a bed of coarse gravel, through which rapidly flowed a stream of warm water, then of course no floor insulation would be required. The heat from the water would prevent freezing. The economics of this case would be quite doubtful, as the heat leakage through the floor and the resultant refrigeration load would be high.

A very small test chamber operating at minus 100 degrees F with two or three feet of cork board or fiber glass floor insulation could be set on damp ground with good heat transmission values and no freezing or heaving would result.

It is conceivable, that with proper research to ascertain the properties of materials, we might place a perfect vapor seal over a sufficient source of heat several feet below the floor level, and then fill with a perfectly dry soil of known insulation value to the underside of the working floor.

Thermal Insulation Only Retards Heat

It must be remembered that heat insulation, unlike electrical insulation, does not stop heat, it merely slows it down, the rate of passage depending on the thickness and the properties of the insulation. All materials have an insulation value, the value of some materials may be low, but there is a value. Where the room temperature is below freezing, and where the ground contains moisture, or will contain any moisture or vapor under operational or seasonal conditions, heat must be furnished to prevent the formation of ice, no matter how much insulation is placed under the floor. The amount of heat required will depend on the insulation.

The heat taken from the earth to the cold storage room must be replaced. The heat required may be furnished from any number of sources, electrical heat, warm oil, brine, warm water, or air circulated in pipes or conduits, or from the earth itself. Ground heat comes from either the sides of the building, or from deep in the earth, depending on the area and shape of the building. A long narrow building would get more heat from the sides than a square building of the same area.

If a cold storage building is being planned, steps must be taken to prevent damage to the building under any conditions. The amount of insulation to be placed in the floor, and its cost, must be balanced against the cost of furnishing heat to the under side of the floor, and the cost of refrigeration machinery and its operation.

The writer has designed and supervised construction of a number of fresh fruit storages in the 27 to 30 F. class in nominally dry areas, and as a result of studies, we do not consider the use of conventional floor insulation as economical. Depending on the soil, we sometimes specify a layer of crushed rock, or equivalent under the floor, but the barrier to vapor must be kept to a minimum.

Skating Rink Floor

Some years ago we prepared plans and specifications for an ice skating rink with brine coils in the monolithic concrete floor slab. The rink operates nine months of the year with 18 degree operating brine temperature. This slab is over nominal insulation and 18 inches of drained coarse gravel on damp soil, no outside heat is furnished. The operational qualities of the rink are exceptionally good, and the floor slab is in perfect condition.

A plant constructed by the writer some years ago at car door height, operating nine months per year at minus 10 F has a floor with only nominal insulation, but over coarse washed gravel. The only heat source is the earth itself and that floor is still in perfect shape. However, there is another plant in this area designed by a government agency and constructed ten years ago at car door height, which works constantly at minus 10 F with a nominally insulated floor over boulders, sand, gravel, and earth. Two years ago the floor of this building heaved and caused considerable damage, requiring heavy repairs.

A ground level plant we designed for the Skagit Cold Storage Co. at Mount Vernon, Washington (INDUSTRIAL REFRIGERATION, Jan. 1954) is now completing its first year of operation. It is 140 by 220 feet and 20 feet to underside of the trusses. The room temperature is minus 10 F. The ground under is sand and gravel with a small amount of clay, and there is moisture available to the soil. Six inches of cork board is placed in the floor and the floor furnished on the underside with a moderate amount of heat by means of air ducts (see Figs. 1 and 2). Distant reading electric thermometers were installed at several representative locations under the floor. A month after the plant went into operation the soil temperature dropped to 40 degrees and has remained constant ever since.

(Continued on page 48)

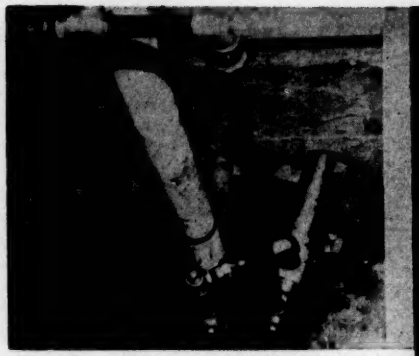


Fig. 3 — Steam and condensate piping arrangements required to melt ice beneath ground floor of a California plant.

Fig. 4 Right — Workman drilling frozen ground for installation of piping to heat soil after floor heaving has taken place. Experiences with this cold storage problem were related by Ed. L. Nelson in October 1951, Ice and Refrigeration.

Food Preservation with the use of Irradiation

This progress report on the sterilization of foods by Atomic Rays indicates a revolutionary change in the field of food preservation. How it affects refrigerated storage.

BERNARD E. PROCTOR
Massachusetts Institute of Technology
Cambridge, Mass.

IT is well known that the conventional means of food preservation by application of heat may alter the flavor, color, and texture of many foods. Such alterations are sometimes advantageous, and many of them have been made acceptable by the changing food habits of American consumers. But for some food products it would be desirable if these alterations were less extensive, and the flavors of some foods, especially fruits and vegetables, are preferred in the fresh or uncooked state.

Some improvements have been made with a number of food products to avoid these alterations in flavor, color, and texture by subjecting the foods to extremely high temperatures for a very short time. In recent years much research has been conducted to ascertain whether color, flavor, and retention of nutrients in processed foods can be improved by using a means of preservation other than heat.

Irradiation as a means of preserving perishable foods has attracted much interest, from both the scientific and the business angle. Whether this experimental process will ever supplant refrigeration is a question that cannot be answered yet. But it is recognized that it can be used to extend the storage life of foods kept under refrigeration. From that standpoint it is of much interest to refrigerated warehousemen, frozen food producers and others in the business of preserving perishables with refrigeration.

High Energy Particles

Among the alternatives that have been considered to attain this objective is the utilization of some of the electromagnetic radiations and high energy particles, such as ultraviolet light, infra-red rays, X-rays, gamma rays, and cathode rays (electrons). Research has been conducted by several laboratories to investigate the efficacy of sterilization by these electromagnetic radiations, especially ultraviolet light, X-rays, and Cathode rays, because little if any heat is produced when foods are irradiated by these rays.

It has been found that ultraviolet light may have a sterilizing effect, but this effect is limited to the surface of foods. Ultraviolet light may also increase the vitamin D content of milk, when applied to a thin film of the milk.

Paper presented at annual convention National Association of Refrigerated Warehouses, Boca Raton, Florida.

X-Ray Studies

X-rays can be used to destroy microorganisms such as bacteria in foods, but the process is inefficient from the standpoints of power efficiency and time required for sterilization. Starting about 1946, X-ray studies were conducted actively in our Food Technology Laboratories at the Massachusetts Institute of Technology. The net result was that a wide variety of foods were treated with X-rays, and it was found that they could be sterilized by this means. Many types of spoilage and disease microorganisms in pure culture were also exposed to X-rays, and observations showed that all were killed. The time required for sterilization by X-rays, however, was of the order of 15 to 30 minutes, which is far too long for an economic commercial procedure.

At about the same time as our X-ray studies, a model of the Van de Graaff Accelerator was placed at our disposal, and much of the earlier research was repeated with electrons or cathode rays instead of X-rays. Use of electrons shortened the time necessary for sterilization, from minutes to seconds or fractions of a second, but decreased the depth of penetration of the rays from inches to fractions of an inch. This fundamentally new process of sterilization by cathode rays may be praticularly suitable for many types of heat sensitive materials, including pharmaceuticals and foods.

Cathode rays or electrons are tiny, negatively charged, elementary particles that swarm about the nuclei or minute cores of atoms, much as the planets move about the sun. Electrons for sterilization are readily released by heating a tungsten filament to several thousand degrees Centigrade. When electrons from such a source in a vacuum are acted upon by a high-energy electric field between two metal electrodes, they are accelerated away from the negative or cathode electrode and acquire the energy in volts that produced this field.

In our investigations at the Massachusetts Institute of Technology, electrons are accelerated to energies of 2, 3, and 4 million volts by means of a Van de Graaff Electrostatic Accelerator. The electrons emerge from a tube into the air through a thin aluminum window. This continuous stream of high-energy charged particles may be directed at a conveyor belt loaded with the product to be treated. Sterilization can now be achieved as the final step in the manufacture of a food product by conveying the product on a moving belt through a stream of high-energy electrons.

Cathode Ray Studies

In our cathode ray studies, evidence has been obtained that all types of spoilage organisms in foods can be killed in brief intervals of time, a few seconds at most, in any type of food container, by application of cathode rays produced by Van de Graaff generators.

The only limiting factor is the depth of penetration of the cathode rays, which is dependent on voltage. The penetration of cathode rays is approximately one centimeter for

each two million volts of energy. This means that when 3 m. e. v. cathode rays are used, oblong sardine cans 16 mm. in depth must be exposed from both sides in order for the contents to be completely sterilized. A linear electron accelerator is now available that can produce 10 m. e. v. cathode rays having a depth of penetration of about 8.5 cm. With 16 m. e. v. cathode rays the contents of a No. 2 can (about 13 cm. in height) can be sterilized completely by exposing both ends of the can to the radiations.

This sterilization is accomplished without any appreciable increase in the temperature of the product, and the nutritive value of the food and its vitamin content are not markedly impaired.

Individual Components of Foods

Having ascertained that food products can be sterilized by ionizing radiations (X-rays and cathode rays), we next endeavored to determine what, if anything, happens to the individual components of foods such as vitamins, amino acids, enzymes, fats, and carbohydrates when they are exposed to these radiations. In other words, we sought to find out whether foods have the same nutritive value after irradiation as they have before.

The protein components in foods, that is, the amino acids, have been found by microbiological tests to be practically unaffected by cathode rays. Fats and oils, however, tend to take on a rancid flavor, and some carbohydrate compounds are changed in flavor slightly when exposed to ionizing radiations.

We have also studied enzymes, those organic substances that accelerate specific transformation of materials in plant and animal tissues. We found that the activity of enzymes is less readily inhibited by cathode rays than is the activity of microorganisms. The dose of cathode rays required for enzyme inactivation appears to be approximately 10 to 20 times that required for inactivation of microorganisms. This greater dose required for enzyme inactivation is a matter of considerable importance when one is considering the possibility of sterilizing certain kinds of foods, especially fresh fruits and vegetables and milk. The enzyme systems in such foods may produce gas atmospheres, with the development of carbon dioxide, or may cause chemical changes that result in the breakdown of protein, abnormal colors, and other absormal conditions.

Tests on vitamin A, carotene, vitamin C, several components of the vitamin B complex, and other vitamins showed that these are little affected by ionizing radiations when they are present along with considerable organic matter, such as foods. When these vitamins are irradiated in pure solution and in high dilution, however, ionizing radiations at a sterilization level cause severe damage. The factor of degree of concentration, therefore, plays a considerable role.

In the course of our experiments with vitamins, we found that some of these compounds are much more sensitive to the destructive action of radiations (radio-sensitive) when irradiated alone than when irradiated in combination with other compounds. Vitamin C (ascorbic acid), for example, is relatively radio sensitive and niacin is more radio resistant. Yet when a mixture of the two was irradiated, the niacin protected the ascorbic acid so that there was greater destruction of the niacin and a sparing of the ascorbic acid. The same phenomenon was noted with other vitamins studied singly and in combination. These unexpected findings have provided *leads for the possible future use of protective agents in the sterilization of foods by cathode rays to minimize flavor changes resulting from irradiation.*

With respect to vegetables, considerable effort has been directed to determine what happens to cellular tissues when vegetables are exposed to cathode rays. Microchemical techniques were used for this study. By means of a selective staining method employing ruthenium red as the stain, it appears that the pectin material in white potato and apples is converted in some way or possibly destroyed when the irradiation is very high.

Packaging Materials

Consideration has also been given to packaging materials. It has been found possible to sterilize various foods in every known conventional type of food container, namely, of metal, glass, or fibre, provided the limitation of depth is taken into consideration.

So far as has been observed, the only container material adversely affected by ionizing radiations at a dose level sufficient to sterilize foods is glass. Usually glass is discolored by the rays. It is known that this discoloration can be prevented by modifying the components of the glass, but this would mean increased expense. If so desired, however, this discoloration of glass could serve as an index that ionizing radiations have been used to sterilize the material in the container.

If desired, containers themselves can be sterilized while empty, provided their thickness is within the limit that can be sterilized at a given high voltage.

Side Effects Produced in Foods by Radiations

We have found that when ionizing radiations are used to sterilize foods, side effects (chemical changes) are produced that cause changes in flavor, color, odor, and sometimes texture. Such changes have been minimized by irradiation of the food in inert gas atmospheres or under vacuum, and especially by irradiation of the food material in the frozen state. Unfortunately, however, such methods do not completely prevent these chemical changes.

As a result of our finding that certain vitamins exert a protective action for other vitamins when irradiated together and from theoretical considerations of radiochemical phenomena occurring when ionizing radiations react with water, we have discovered a means for preventing some of these undesirable changes in color, odor, and the like in some food products and a means for minimizing others. Experiments are now actively in progress to determine to what extent this method may be effective in other foods.

Animal Studies with Irradiated Foods

When any new process is used for the sterilization of foods, one should make certain that the end product will not have any adverse effects on humans or animals. Animal tests to answer this question are now in progress in our laboratories and elsewhere. The approval of governmental control agencies, in this case the Federal Food and Drug Administration, is essential when any new food products are offered for human consumption.

Products Other than Foods

Among the products other than foods that have been successfully sterilized by ionizing radiations are the following: Surgical sutures (no loss of tensile strength), Sausage casings, Tissues (aortas), Cotton, surgical-type materials (bandages), Toothbrushes, Antibiotics (penicillin, streptomycin, etc., but not insulin), Viruses, Blood.

It has been shown by other investigators that trichinae, the causative agent of trichinosis, a disease sometimes transmitted through pork that has not been properly cooked, can be killed by very low doses of radiations. For this purpose, however, the use of refrigeration is probably a less expensive procedure.

Treating Grain Seeds

Annually in the United States a large quantity of grain valued at millions of dollars is lost because of the infestation of weevils, the prime pests of millers and bakers. Chemical methods of killing these pests have not proved as efficacious as could be wished, and the use of heat is not possible because it injures the baking qualities of the flour. We have found that a relatively small radiation dose of cathode rays can be used to kill all known insects that attack cereal grains. Such treatment can be accomplished by passing the grain in a thin layer, on a moving belt, under an electron beam. The speed of the belt can be regulated so that the grain will receive the proper dose of cathode rays to kill adult insects, eggs, larvae, or pupal forms. Grain, flour, or other materials so treated must be protected subsequently from further insect infestation.

It was also found that such doses of cathode rays as are needed for this purpose are below those that would adversely affect the germinating ability of the grains, if planted. The Army has recently expressed interest in having this feature explored further. Flour from wheat treated in this manner has been made under commercial conditions by a miller, and its quality has been found to be equal to that of an untreated, control batch of flour.

Based on the energy requirements to accomplish this sterilization of cereal grain and the output of the more recent models of super-voltage generators, calculations show that one such machine should be able to sterilize the entire output of a modern flour mill at a cost of a fraction of a cent per pound of flour.

Similar studies have shown the possibility of killing insects in spices and in cereal and fruit bars.

Application of ionizing radiations has been found useful by medical men in the sterilization of blood vessels. Medical investigators in Boston have reported recently that blood vessels (such as aortas) sterilized by this process have been successfully transferred to patients requiring replacement of vital sections of such vessels. These sterilized materials can be stored for prolonged periods. This process may make possible "banks" of sterilized blood vessels for emergency use, similar to our present-day blood banks. Great interest has been aroused among medical scientists concerning the possibilities of using this method as a means of extending lives. About twenty humans have now been successfully treated with new aortas transplanted from other sources.

Use of Fission By-Products

Applications of the findings on foods are now being extended at the Massachusetts Institute of Technology to determine whether by-products of atomic energy can accomplish the same sterilizing effects on foods and other materials that have been achieved with the electrical equipment. In 1951 we were invited to participate in another aspect of the application of X-rays and cathode rays to sterilization in the food and pharmaceutical fields. There appear to be substantial quantities of radioactive fission by-products that might be used for sterilization purposes, if this were feasible. How large these quantities are is, of course, classified (secret) data.

The unsolved problems in the use of radioactive fission by-products are even more in number than those in the use of electrostatic accelerators, as the economics of such a sterilizing process can only be surmised, dependent on the costs allocated to this type of radioactive material. The disposal of such by-products or wastes presents an expense problem. If these wastes have to be subjected to separation or purification processes before they can be used for sterilization of foods and drugs, further expense will be entailed.

Our primary investigation with the use of radiations (gamma rays) from a fission by-product was conducted with a mock source, namely, a kilocurie radioactive source of Cobalt-60, which was obtained through the Brookhaven National Laboratory of the United States Atomic Energy Commission. This kilocurie (thousand curies) source has an energy equivalent approximately that of an amount of radium worth about 25 million dollars at the current price level more than the world's supply of radium a few years ago. However, this source is almost a toy compared with the three-million-electron-volt accelerators we have been using. In fact, the ratio of the energy of the Cobalt-60 source to the energy of the 3 m.e.v. accelerator is about 1 to 750.

To sterilize milk in a small-sized container by means of this source would require the best part of a day. Hence this particular source may not be considered as a high-speed equipment. Nevertheless many fundamental facts may be determined by research with this source, facts on which may be based the design, the construction, and the operation of equipment having major potentialities.

More recently, in fact since the beginning of 1954, we have been provided with a more powerful source of gamma rays, to continue these studies relating to food sterilization. Actually this more powerful source is composed of a mixture of the by-products from an atomic fission products plant.

Our first job in comparing the effects of gamma rays with those of cathode rays and x-rays was to ascertain whether, unit for unit of energy, the same sterilizing or inactivating results could be obtained. Our answer to this is yes. All the products sterilized by x-rays may be sterilized by cathode rays and by gamma rays, if time of exposure is sufficient and energy of equivalent level is available. Are the results the same? To all intents and purposes yes.

Summary

Now I suppose I should try to sum up what all this means to you at this time. I will try to do this briefly and as accurately as I am able.

First, let me say that this endeavor

is still in the research stage. Much is known, but there is still much to be learned. Encouraging results have already been obtained, however, and much progress in this field may be expected in the future.

The use of cathode rays presents interesting possibilities, although the installation and maintenance costs of the equipment producing these rays may limit the extent of such use. This is one of the reasons why this irradiation process is not currently used commercially by any food processor. Many problems are yet to be solved before an economically efficient means of utilizing ionizing radiations is developed for processing large quantities of food at the rapid rates of production that would be required in large food manufacturing operations.

Furthermore, the irradiation process may not be used by any food processor until it has met with the approval of the Federal food authorities. For this approval, feeding tests with animals are required, to demonstrate that foods thus sterilized have no adverse effects. Such feeding tests necessitate many months of work.

Another limiting factor in the use of ionizing radiations for food preservation may be the undesirable color and flavor changes, which vary greatly dependent on the products irradiated. Means of minimizing certain of these undesirable changes have been found, but the flavor problem has not been solved in respect to many commodities, and we have found only one plant product the flavor of which really seems to be improved by this type of treatment. It is hoped that ultimately procedures will be developed avoiding any undesirable changes in color and flavor in all types of food products.

Use in Extending Storage Life of Foods

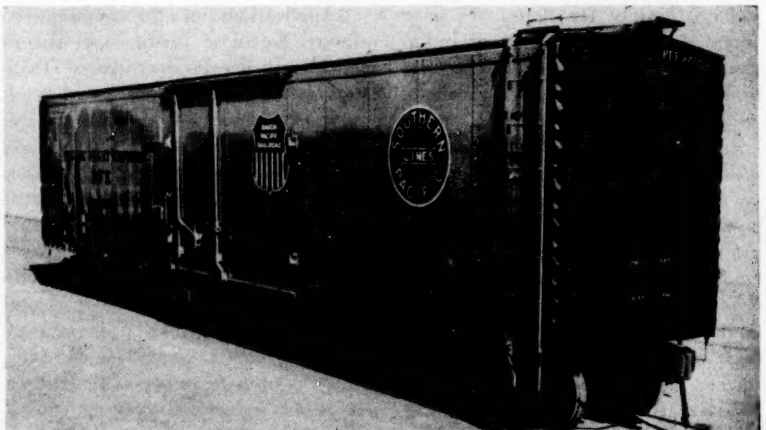
It seems likely that the irradiation of foods may have wider utilization in extending the storage life of foods kept under refrigeration than in preserving foods not kept under refrigeration. The facts that enzymes are concerned in problems of food preservation and that enzymes are not easily inactivated by irradiation are, in part, responsible for this prophecy. Refrigeration is a great asset under such conditions.

Some most promising results of this nature have been obtained within the past year. Detailed reports of these experiments will be available shortly. Vast, uncharted fields for the application of ionizing radiations are daily being opened by the development of new physical and electrical equipment, capable of use in the food field.

Perhaps the day is not far away when atomic energy may have great significance in times of peace as well as of war. One might predict that an important peacetime use of atomic energy might sometimes be to extend the storage life of perishable foods by the combined use of gamma radiation from radioactive wastes and subsequent storage at refrigeration temperatures. If this prediction proves to be accurate, such use of atomic energy would augment the already strategic services that your great industry has for over a century provided for the food industries and the general population of this wonderful country in which we are fortunate to live.

Pacific Fruit Express Adds to Fleet of Mechanical Refrigerator Cars

ANOTHER 200 mechanically refrigerated "super-giant" refrigerator cars will be constructed by Pacific Fruit Express Company at its shops in Roseville, California, putting on wheels a type of refrigeration equal to the finest commercial automatic freezers, according to announcement by K. V. Plummer, vice-president and general manager of the Company. Pacific Fruit Express Co. is jointly owned by Southern Pacific and Union Pacific Railroads.



One of the new mechanical refrigerator cars now in operation by Pacific Fruit Express Company

The new refrigerators will raise the company's total of such cars to 337, and its total refrigerator fleet to about 39,000, Mr. Plummer said. The super giant cars, longer than conventional ice refrigerated cars and with insulation 50 percent thicker, are designed specifically to transport frozen foods.

Each car has two independent compressor-evaporator refrigeration systems, it was explained, powered by one Diesel-electric power plant in a compartment at one end of the car. Air chilled by this system is forced through ducts throughout the ceiling, down inside the hollow walls and back through a space provided under the floor, thus creating a cold air envelope around the load but not touching it. Exterior heat is excluded by 10½ inches of insulation in the roof of the car and 7 inches of insulation in sides, ends and floor. Defrosting by electric heaters is automatic every 24 hours.

Construction of the 200 new cars will get under way about September 1 so as to maintain volume of work at the Roseville shops in what ordinarily would be the shop's slack season, Mr. Plummer said. Production should be at the rate of about two cars a day by January, he estimated, with expectation that all cars will be completed in the spring of 1955.

New Refrigerated Cargo Service – Miami to Latin American Countries

A NEW refrigerated cargo service was recently inaugurated from Miami to Latin American Countries by the Three Bays Line which will have three refrigerated ships making regular direct sailings to the Virgin Islands, Aruba, Curacao, Venezuela, Colombia and Panama. First ship to sail from Miami was the Cotton Bay on February 1, followed by two others, the Ariana and Winding Bay, to maintain weekly service to ports in the above countries. Calls will also be made at Jacksonville, Tampa and Galveston, Texas.

This is reported to be not only the first reefer run, but also the first regular cargo service in this trade from Miami. The latest in refrigeration equipment has been installed aboard the vessels by Carrier-Marine Division. Any desired temperature can be maintained independently in three holds. Thus it is possible to carry frozen foods, fresh produce, and non-refrigerated cargo, all at one time. Bananas are frequently brought into Miami by non-refrigerated boats but losses due to overripeness are reported to be as high as 25 percent with only five days travel. These ships will be able to make the eight to nine day voyage from Panama, where fruit companies maintain their own plantations, with virtually no loss. Frozen vegetables grown in Texas will be shipped from Galveston to Latin countries.

Announcement Ceremonies

Special ceremony marked the first voyage with Orange-Bowl-Queen Barbara McCririck cutting the ribbon to welcome the party of company officials, press, radio and television personnel, aboard for a luncheon and inspection of the ship. A banquet was also given at the Biscayne Terrace Hotel to celebrate the occasion. Consular representatives of the Latin countries the line will serve, and about 150 other persons were present.

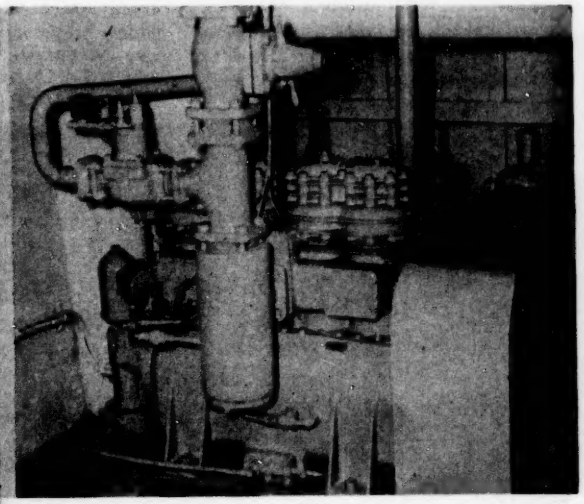
Dorman Sisk, president of Dorman Sisk Agency, Inc., has been appointed general agent. His offices are in the same building with Three Bays Line on the Miami piers.

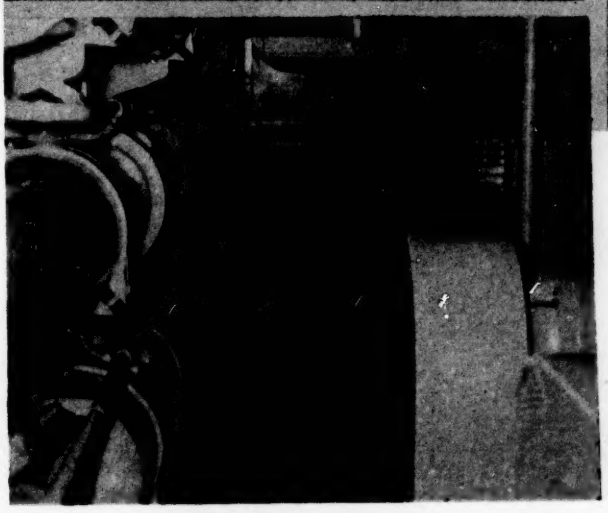
Refrigeration Details

The ships are insulated with Johns Manville cellular insulation. Refrigeration is by direct expansion Freon systems with three 50-ton compressors fitted by Carrier. Two are capable of maintaining zero degrees in all three holds at once, leaving one stand-by. Eight blower type coils with fans powered by two-speed Star-Kimble motors circulate the cold air through ducts to the holds. Two each are used in the Nos. 1 and 3 holds, and four in the No. 2 hold.

Each of the three cargo hatches

(Continued on page 48)





Upper left: M V Cotton Bay, first of three newly refrigerated vessels, in regular service between Florida and Latin-Carribean nations. Lower left: View of reefer machinery flat directly above vessel engine room. Two of three Carrier 4-cylinder Marine type reciprocating compressors at right. Three condensers and two receivers mounted on left bulkhead. Above: One of the three 50 ton Carrier units controllng temperature at three different levels. One unit maintains all temperatures but other two are used for fast cooling and standby service.

They Skate in the Shade in Denver's Outdoor Rink

J. L. HAINES
Grounds Superintendent
Denver Country Club

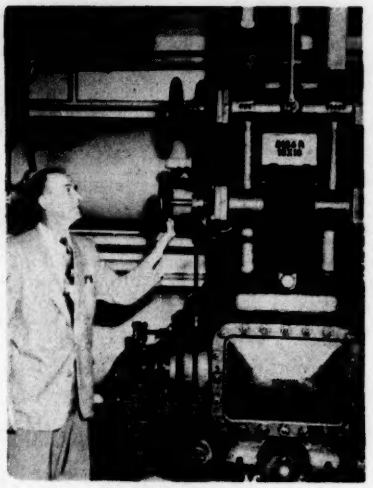
MANY times during winter months the temperature in Denver reaches 50 F and above, and the penetrating sunshine out that way would quickly melt the ice in a skating rink and eliminate any possibility of skating. So we decided to shade our rink from the powerful rays of the sun during winter months.

Our rink is an open structure about 85 feet wide and nearly 185 feet long which provides adequate space for hockey and standard ice shows. Our refrigeration setup is housed in a building near the rink which is 52 feet long by 23 feet wide. We operate the rink as an outdoor affair for a full five months of each year.

Our refrigeration equipment includes one 10 x 10, 125 hp Frick and one 7 x 7, 75 hp Frick compressor, using ammonia as the refrigerating agent. The freezing and hardness control of the rink ice is maintained by circulating chilled calcium chloride brine through wrought iron pipes. This is done in a manner so the differential brine temperature is less than two degrees for the brine going to and returning from the rink to the refrigerating plant. By maintaining this close tolerance we are able to achieve a uniform hardness of ice over the entire rink area at all times.

Shading the Rink

When we originally constructed our rink we knew that the heat from the winter sun would give us some trouble in maintaining uniform ice, so we decided to shade the rink. Our shades are made up to 36 inches wide, of 7 ounce osnaburg sewed to No. 10 waterproof sash cord. The cord runs from top to bottom of each shade. Each panel is lapped four inches over the next. The shades are eight feet wide and proper length to cross the rink East and West. An extra length of rope is left at the ends to act as guy ropes and they are secured at the North and South end cables which also carry the end shades. This allows the shades to sway in the wind, and also allows wind to pass between the 36 inch wide panels without too much damage.



One of the compressors in engine room of Denver Country Club skating rink. J. L. Haines, grounds superintendent alongside.

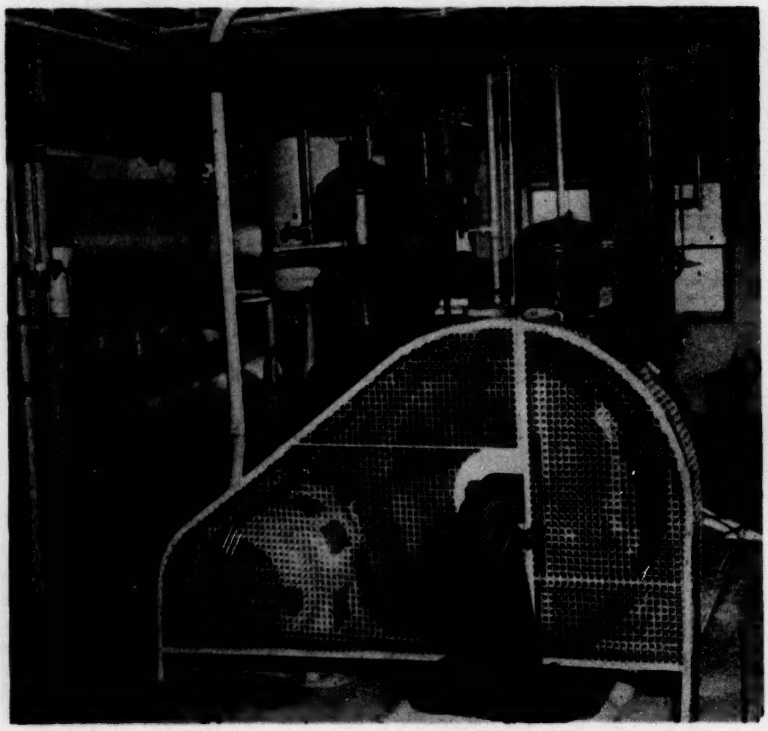
Telephone poles are set along the North and South ends at about 25 foot intervals and they are well guyed. We stretched a 3/8 inch galvanized guy strand wire between each of these poles at a level of about 22 feet above the rink surface. This wire is secured to the poles with 1/2 inch galvanized eye bolts fastened to the poles. Any sag adjustment is easily taken care of by tightening up on the eye bolts.

The shades are hung at approximately six foot intervals across the rink, and this arrangement is not entirely satisfactory to us because it is impossible to remove the shades for evening skating or during heavy wind storms.

Shades Adjustable

Certain precautions must be taken to adjust the shades during changes in the weather conditions. For example, a sudden snow storm may leave heavy deposits of snow in the shades and stretch them out of proportion, and perhaps damage the entire setup. In construction of the rink and similar shading operations, it is always advisable to plan the rink so the shades will run in such direction to receive only the minimum wind strengths and still be in position to supply rink shade.

Our rink has been most satisfactory during the past three years it has been operating, and each year we hold two ice shows and three hockey practice games per week during the five months it is open.



View of compressor room in Denver Country Club skating rink.

Vacuum Precooling Plants Provide Service For Vegetable Shippers

VACUUM pre-cooling facilities are now available to shippers at all Imperial Valley shipping points with two plants each in operation in Holtville and El Centro and a fifth at Brawley. In production for the first time this season is the large, modern Shippers Service Company's plant in El Centro and the portable cooling structure installed by the Consolidated Cooling Corporation in Brawley.

The Shippers Service is a vacuum pre-cooling organization comprised of a group of Imperial Valley growers-shippers, associated in limited partnership with Bruce Church, Bruce Church Company, Salinas, and M. O. Best, M. O. Best Company, Phoenix, as general partners. General management of the new firm is under the direction of Thomas B. Henderson. Plant manager is Ralph Westerkamp of Salinas whose assistant is Bob Brooks.

Angelo Lucido, Jr. is president of the Consolidated Cooling Corporation plant at Brawley with Alan Frojen the plant manager. The Brawley plant is the same type as those operated by the Vacuum Cooling Company and is operating as licensee of Vacuum Cooling.

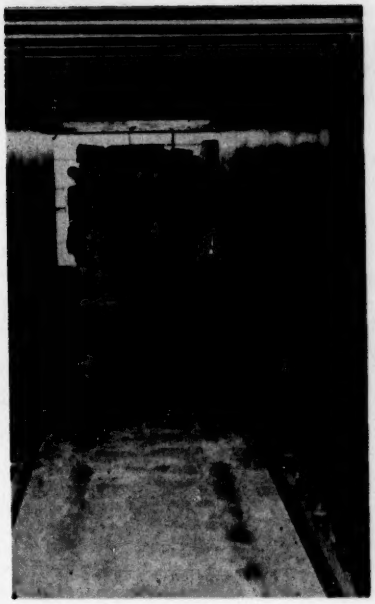
Major Step Forward

"Sizable investment in our new and modern plant is an emphatic expression by the grower-shipper owners of Shippers Service Company of the vision and confidence they have in the future of the Imperial Valley vegetable industry," General Manager Thomas B. Henderson, said. He added, "it is a major step forward in keeping abreast of the revolutionary changes the industry is experiencing."

One of the largest units in the El Centro industrial area, the plant is of steel and concrete construction. General engineering contractors was the AMCO Company of El Centro, utilizing the Acmeclerespan, a product of the Acme Steel Company of Phoenix, Arizona. The specialized Conveyco system in operation at the plant was designed and installed by the Conveyor Company of Los Angeles.

The plant embraces 21,000 square feet of floor space with adjoining concrete aprons providing ample room for unloading and maneuvering. Capacity from the four large tubes is rated at six cars an hour, but there is room for the addition of two more tubes, which would increase production by a third.

Four vacuum tubes in Shippers Service plant where lettuce is cooled.



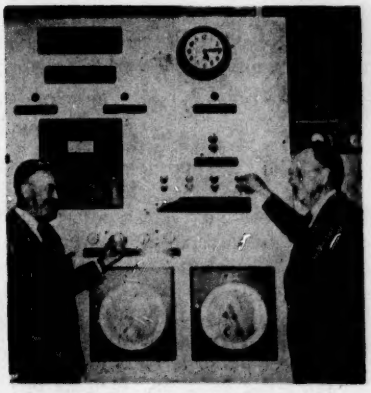
These 320 cartons of lettuce loaded on dolly, ready to enter retort for cooling.

Refrigerating Equipment

The plant has an ice making capacity of approximately 425 tons per day with considerable ice storage capacity and in machine capacity has the following equipment available for both ice making and vacuum cooling as required. One 3 cylinder 16 x 18 York vertical, one 4 cylinder 11½ x 10 York vertical, two 2 cylinder 10 x 10 York vertical, one 2 cylinder 10½ x 10½ DeLaVerne vertical, one 2 cylinder 6 x 6 Baker.

When the vacuum cooling plant shuts down after completing the day's run, all refrigeration capacity is available for ice making.

This four-tube vacuum cooling



Control panel for Shippers Service Vacuum plant.

plant was engineered and installed complete by the Gay Engineering Corporation and has been trade marked GAYVAC system and will process approximately five cars of lettuce per hour.

Automatic Precooling

Commodities are precooled by a temperature control system that automatically switches off the pumps at the proper temperature degree. A feature instituted by the Shippers Service Company is a private phone installed for the convenience of the buyers.

Plans to make Brawley's first vacuum cooling plant a permanent installation are being studied by Consolidated Cooling Corporation. President Lucido has advised Northend shippers, "We hope to establish the plant here on a permanent basis and are planning to conduct experiments with local cantaloupes and sweet corn from the Calipatria area in an effort to extend the cooling operations through a greater portion of the year," he said.

The portable unit was first put into service in Santa Clara. It was moved to Brawley from Hereford, Texas, and was in operation within two weeks after arrival. Normal capacity is three cars an hour with room for installation of another tube. Operations will be 'round the clock, employing about 20 men per shift for two shifts.

Although shippers have experienced a steady rise in operational costs, it was pointed out by the firm's president, that "Charges for cooling lettuce by the vacuum system have not changed for four years and no increase is being contemplated by our company."

Canadian Engineers Hear Practical Discussion of Heat Pump

ENGINEERS attending the 68th annual meeting of The Engineering Institute of Canada at Quebec City May 14 heard an interesting discussion of the "Heat Pump". The speaker was James B. Templeton, Head of the Engineering Section, Defense Research Northern Laboratory, Fort Churchill, Manitoba.

"Invented by Lord Kelvin just one hundred years ago, the heat pump is simple to operate," he said. "Any ordinary domestic refrigerator is a heat pump." It extracts heat at low temperature from within the refrigerated enclosure, and wastes it at a higher temperature into the kitchen. In the heat pump the heat that is discharged is made use of for heating buildings. That is the only practical difference between a refrigerator and a heat pump.

Special Advantages

Mr. Templeton called attention to the special advantages of this type of heating equipment. It can supply heat for dwellings, fresh water that can be pumped from building to building, and electric power for operation of lights, toasters, washers, irons and the like, all with a minimum of fuel consumption.

The heat pump is ideal for use in hard-to-get-at locations, such as our Arctic or sub-Arctic defence installations, he said. Basically when so used it is a standard refrigerating unit, driven by a diesel engine, with a clever device attached for disposing of the ice formed from the water used as a heat source.

Normal heat sources for the heat pump are air, ground and/or ground water, and water. Air is ruled out for northern locations due to the extreme low temperatures during the long winters. The ground is almost so, due to the ground being permanently frozen to great depths. Water holds the greatest promise. The average water temperature below ice cover is about 1½ degrees above freezing, but the water can be piped to a device which will freeze it, where and in such form that the ice can easily be disposed of.

Such a device, designed at the University of Toronto and built by the Canadian Ice Machine Co., has been installed at Churchill and operated for the last four winters. It turns out nearly four tons of ice daily in the form of flakes, which are removed by a screw conveyor, fanned through a vertical stack, and dispersed by the high winds.

Water Heating

The unit is designed chiefly for water heating. Heat from the diesel engine exhaust and the cylinder jacket is mostly recovered and put to use. Approximately three times as much heat is recovered as would be obtained from burning the same amount of fuel in the conventional type of oil burning space heater. Though this present installation is not yet fully reliable, its economy is already proven and it could be readily brought to a high standard of efficiency.

The greatest problem is the supply of water. Few shorelines surrounding northern bodies of water drop off steeply. Intake pipes must pass over long distances through water areas well below the freezing point, and must be drained at once when the pump is shut down. Flow in the pipe must be fast and strong at all times. The pipeline must be insulated between the building and the point where it enters the water below the ice cover. Snow fences are useful to create snow-drifts on top of the pipe as added insulation.

Diehl Presented Award By Food Technologists

AT a dinner meeting of the Chicago Section Institute of Food Technologists held at the Palmer House, Chicago, Monday evening, April 19, Dr. H. C. (Dutch) Diehl, director of The Refrigeration Research Foundation was presented an award in recognition of his service in the field of food technology. The award was in the form of a gavel, symbolizing his two-year term as president of the Institute in 1948-49.

In responding Dr. Diehl said he accepted the award with pleasure, but also with humility. It is a unique experience, he said, to become aware of the reservoir of ability among people who have the same interests when something needs to be done and this is particularly true of members of the Institute.

Following presentation of the award and its acceptance, Dr. Diehl delivered a prepared address pointing up the achievements of research and the vast field of exploration that lies before it. Industrial refrigeration he said, is particularly important to the modern world because it touches so many industries and research in this field has already uncovered a vast amount of information which has been of practical and lasting benefit.

Presiding at the meeting was Dr. John Jackson, manager Research Division American Can Company, vice-president of the Chapter. Plans for the dinner and meeting were arranged by R. D. Trelease, Swift & Co., Chairman of the Public Relations Committee of the Chapter.

A NEW DEVELOPMENT
OF
ARMSTRONG RESEARCH

LT-30 cork covering ... *a new kind of pipe insulation for dual temperature lines*

Here's a brand-new insulation that offers the high efficiency, strength, and long life of molded cork covering, yet can be installed at much lower cost.

This new material, LT-30 Cork Covering, is fabricated from precision-cut sections of Armstrong's Corkboard, bonded to a special three-ply vaporproof paper. It's used on dual temperature air-conditioning lines, chilled water, and other cold lines. LT-30 prevents sweating under normal conditions where liquid temperatures in the line are 30° F. or above. On hot water cycles, it withstands temperatures up to 200° F.

Application is fast and easy. Simply apply LT-30 Adhesive to an overlap, hold the covering around the pipe, and press the lap in place.

LT-30 Cork Covering is another product of Armstrong's continuing efforts in the laboratory and in the field to improve insulation materials and application methods. For further details on LT-30 Cork Covering, as well as on Armstrong's regular line of molded cork covering, and other industrial insulations, call your nearest Armstrong office or write Armstrong Cork Company, 202 Stratton Street, Lancaster, Pennsylvania.

After the covering is wrapped around the pipe, joints are sealed by strips of LT-30 Paper. There is no need for a further indoor finish, but where color identification is desirable, Armstrong's Insulcolor may be applied.

ARMSTRONG'S INDUSTRIAL INSULATIONS

Modern Ice Plant Will Supply Ice For Vegetable and Fruit Refrigerator Cars

THE Harman Ice & Coal Company of Johnson City, Tennessee, recently completed a new 40-ton ice plant at Erwin, Tennessee, known as The Harman Ice & Storage Company. The ice from this plant is used for re-icing vegetable and fruit refrigerator cars under contract with the Fruit Growers Express Company.

The plant is located at the Clinchfield Railroad Yards at Erwin. The Clinchfield Railroad runs from Spartanburg, S. C., to Elkhorn, Ky., and is a link in the quickest route from Florida, Georgia and the Carolinas to the Detroit area.

View of new Harman ice plant, railroad siding and lower railroad ice platform from which ice conveyor carries ice on incline to upper railroad icing platform.

Formal Opening in March

The formal opening of this plant was held on the afternoon of March 25, 1954, and was attended by officials of the Railroad and invited guests. At the conclusion of the inspection, the guests were entertained by R. E. Harman and H. E. Harman at the Johnson City Country Club with a social hour and delightful steak dinner. The plant was open for inspection by the public the next day. It is the last word in ice plant design and the building is of steel and masonry construction with cork insulated tank and ice storage rooms. It is fully automatic in operation except for pulling and storing the ice.

The ice making tank contains 432 — 300 lb Knickerbocker cans arranged in 6-can galvanized grids; standard vertiflow coil evaporator with accumulator and automatic float control; and vertical 3 hp brine agitator. The full capacity is harvested in one 8-hour shift per day using a 2-ton, 3-way Shepard electric crane and hoist, and no attendant is required at the plant during the balance of the day and night. Two employees handle the entire plant operation of harvesting, storing and delivering the ice to the Railroad.

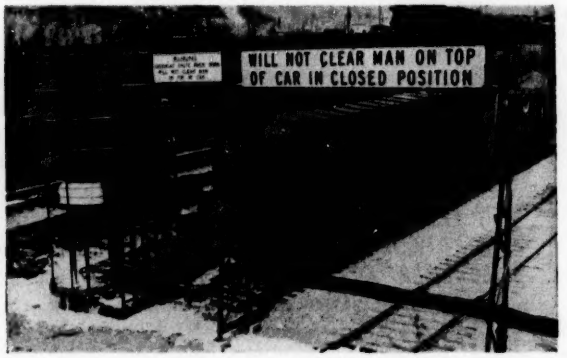
Handling

The Gifford-Wood 2-way chain ice conveyor running across the day storage and the Gifford-Wood ice elevator in the season storage enable handling the ice with a minimum of labor. The operator simply slides the 300 lb ice blocks on the conveyor and they are conveyed past an electric eye type counter which registers every block on a meter counter located on the plant switchboard. The conveyor deliveres the ice through an ice passing door from the day storage onto an ice slide where it travels by gravity to the spiral lowering chute and then down and onto the Railroad conveyor. All of the guests at the opening commented on the ease with which the ice is handled.

Controls

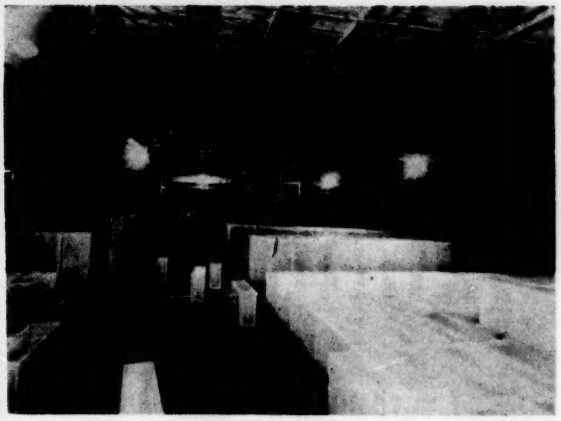
In addition to the automatic motor controls, the plant is equipped with thermostats; solenoid valves; transfer

View of upper railroad ice platform of new Harman icing plant, with ice making plant in the background.



Ice slide running from ice storage to spiral chute which delivers ice by gravity onto conveyor or lower platform.

Close-up view of being pulled from ice making tank.



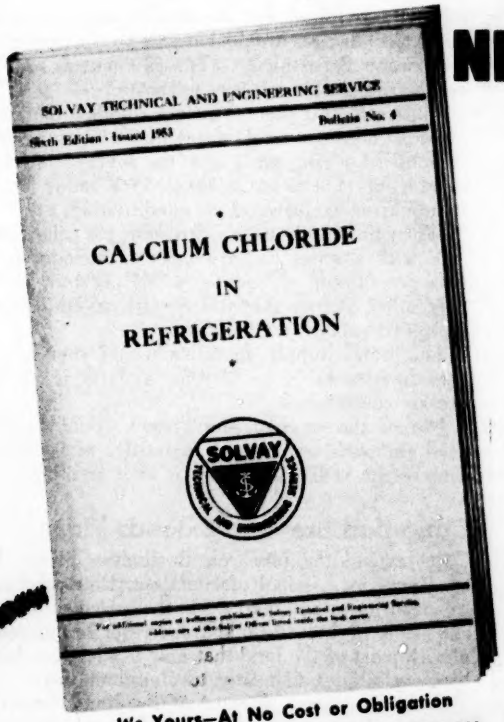
View in 250-ton capacity daily ice storage and work room which is refrigerated by 3 direct ammonia expansion suspended type air coolers with thermostatic expansion valves.

switch to reverse sequence of compressor operation; timing relay to prevent compressor motors from starting at the same time; high and low pressure safety cutouts; float controls and thermostat expansion valves; for complete automatic operation of the refrigeration of the refrigeration system.

This plant was designed by C. P. Goree, Frick Atlanta branch manager, and the machinery, equipment and cork insulation was sold through Commercial Refrigeration Company of Johnson City, Tenn., headed by Mr. V. L. Taylor, which company also installed all the equipment and cork insulation.

New Ice Plant Addition

A CITY building permit for the construction of a one-story masonry and steel addition to the Jacksonville (Fla.) Ice and Cold Storage Company at 1429 West 16th street has been issued. The project will cost $71,888. O. P. Woodcock Company is the contractor.



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the defrosting system that makes Ammonia SHINE!
LUCERNE MILK COMPANY, of Los Angeles, Calif., modernized with KRAMER AMMONIA THERMOBANK automatic defrosting system to end years of expensive manual defrosting.

"BEFORE" photo shows iced condition of the old overhead coils.

"AFTER" photo, same room, modernized with KRAMER Ammonia THERMOBANK at minus 25° F; 6400 gallons hardened daily.

INSTALLED BY ASSOCIATED REFRIGERATING ENGINEERS, LOS ANGELES, CALIFORNIA.

WRITE NOW FOR BULLETIN TA-182

KRAMER TRENTON CO.
Trenton 5, N.J.

Recirculating Water Offers Answer to Air Conditioning Problem

A PRACTICAL scheme for providing enough water during the summer drought season to enable home owners in residential developments to operate home air conditioning units was recently given a group of water works officials from several New Jersey cities by M. M. Lawler, an executive of one of the nation's larger air conditioning manufacturers.

Other methods will have to be worked out for already existing residential areas, Lawler pointed out, but this idea may be of practical value to builders and architects who have large housing developments.

Drought conditions in many parts of the country last summer accentuated the need for seeking an answer to this problem. In a number of instances it became necessary for cities to ban the use of air conditioners for a time to conserve water for cooking and household purposes.

Lawler's suggestion was for architects and builders to design their own recirculating water system, placing the piping under the streets along with the sanitary water supply piping. At some central point, designated as a recreation area, a pumping station and a large cooling tower or spray pond could be constructed.

A spray pond, centrally located in this recreation area park, could be suitably landscaped and beautified, the executive said. Water could be treated to inhibit corrosion and the system could be drained during the winter.

Quite feasibly, he added, the spray pond could be designed for ice skating in the winter by the developer who wants to add an additional sales feature to his development.

As the result of such a system it is estimated that during the hottest weather only one-tenth of the water normally required for air conditioners utilizing water-cooled condensers would have to be purchased from the local water departments. This is about as much as each residence uses for sanitary purposes.

Illustrating his point, Lawler explained that in an average new housing development located several miles from the city supplying the water, the average family of four can be expected to use 3,000 to 4,000 cubic feet of water in a quarter, exclusive of air conditioning.

When the family uses a three-ton air conditioner operated with a water cooled condenser consuming 1½ gallons per minute of cooling water per ton, in the July-September quarter that will require an additional 35,000 to 45,000 cubic feet of water.

The water supply facilities would therefore, Lawler said, have to be 10 to 12 times as large if all the homes are air conditioned.

Use of the recirculating system would cut down the need for such tremendous quantities of water during a time of the year when water is at a premium.

Canadian Brewery Extends Plant

TO extend the plant on Burlington Street, Bradings Breweries Limited of Hamilton, Ontario, Canada are to spend up to $10,000,000 in the next two years. The extension of buildings and increase in equipment will absorb most of the land that now lies behind the existing brewery, almost half way to Hamilton Bay.

Peter Thompson, director of Bradings Breweries, said the extensions and additions would probably mean that in two years the annual output of beer on Burlington street will amount to about 8,000,000 gallons. Market for the increased output from the extended brewery will be found in Hamilton and cities and towns nearby.

Annual Report

Refrigeration Research Foundation

H. C. DIEHL, Director

THE creation of the Foundation in the fall of 1943 has proved to be, in retrospect, one of the wisest actions ever taken by the refrigerated warehousing industry. The initial stockpile of technical knowledge was small, but a decade has seen it grow by geometric advances, partly because we have learned to use not only knowledge newly gained from research but also older information. Experience, industrial and investigative, in the solution of our problems has also expanded. With the years, collaboration with scientists and technologists in our allied industries has mounted and mutual help with mutual advantage has developed.

Facts obtained for the solution of one problem, stored where they could be used again, have proved useful with or without modification for the solution of new problems. For example, our accumulating knowledge of control of condensation, initially sought in relation to candies, later has found application in the storage of lead-acid batteries, edible nuts, dried fruit, and canned foods and beverages under refrigeration.

Successive Annual Reports have mentioned the great values of interindustrial cooperation; this has become an axiom of the Foundations, whether in sponsoring research or in seeking implementation of facts gained from research.

Through the years, more and more Foundation members have learned to participate in the development of the research program through suggestions, guidance, and interested inquiry. This development has been very beneficial and indicates that the interests of the individual warehouse as well as those of the industry are being served.

A cardinal principle of our action has been the activation of results of research — the practical use of technical information — not merely its acquisition and accumulation. The Commodity Storage Manual, the Regional Training Conferences (now jointly conducted with the National Association of Refrigerated Warehouses), the monthly Information Bulletin, and a voluminous correspondence and dissemination of reports, bulletins, and reprints are the well known media for transmittal of information to those who can use it. And these have included not only members of the refrigerated warehousing industry but many in various allied or customer industries.

Ten Years of Research

The changing techniques in the food industries that use refrigeration service (freezing, storage or both) have required not only alertness to meet the changes but a certain "pre-cognition", if we are able, of changes, and preparation through research for the solution of new incidental problems. A good example is the change under way in the poultry industry, from less to more use of evisceration and toward more marketing of cut-up poultry, with more exposed surface. This trend has intensified the problem of surface desiccation, which was already a major problem many years ago.

The trend in frozen poultry storage was toward lower and lower temperatures, sinces the evaporating power of air thus decreases, but economic and operating problems of warehouses were involved. Foundation-sponsored research at Iowa State College gathered basic facts regarding temperature, air humidity, and the paramount importance of packaging. The problem of surface desiccation of frozen poultry is now being gradually conquered by concerted effort involving processors, makes and converters of packaging materials, and refrigerated warehousemen.

Hardly had this storage problem been alleviated when another one moved to the horizon, involving use of "hard" scald for poultry, especially turkeys. This method of scalding has significant economies for processors but aggravates the problem of surface appearance and the behavior of the birds during freezing and storage. Here again, Foundation-sponsored research, at the Western Regional Research Laboratory, conducted with the collaboration of others interested in the problem, has supplied refrigerated warehousemen and their customers essential information regarding the freezing and storage of subscalded poultry.

Thus through research and technical contacts refrigerated warehousemen have not only kept abreast of industrial developments, they have also had opportunity for advance information that has enabled them to render service commensurate with the new technical advances.

Let us look at another major food industry—the candy industry. Through its ten years the Foundation has sponsored investigations on dried fruits, and edible nuts, both ingredients of candies. As a result, increasing amounts of shelled nuts are being held in cold storage throughout the year to preserve their fresh qualities.

But a more extensive opportunity opened, for these studies with ingredients laid the foundation for a comprehensive study of the refrigerated storage of the candies themselves—sponsored jointly by the Foundation and the National Confectioners Association at the Georgia Agricultural Experiment Station. This study has extended widely our understanding of the effects of above and below freezing storage of candies, and of the various effects on the many different types of candy. As a result, increasing amounts of candy are being protected by low-temperature storage.

Hence as the first off-shoot of the candy-storage research, the Foundation has sponsored investigation of condensation control at Columbia University and Georgia Agricultural Experiment Station. These studies, while incomplete, have already moved well along toward a clearer understanding of dew-point problems, as they affect commodities and packages, individually and together.

Then, as has occurred so frequently, a new challenge appeared in the prospect of refrigerated storage of rations for the armed forces. There was urgency in this matter and, as in similar cases, an arrangement for short-term investigation was used to hasten the acquisition of specific practical information, without relaxation of effort to attain the long term objective of ultimate solution of the problem of condensation.

And this chain of events has extended further. Since candies are important ingredients of military rations, and the Georgia Experiment Station had obtained extensive information on cold storage of confections, the studies on rations there have been extended by the armed forces, to cover a five-year period.

Abstract from annual report of Director, The Refrigeration Research Foundation for 1953.

Here, then is a brief account of a sequence in industrial research which has continued for about seven years. The increase in basic and applied knowledge has been substantial and the results have been used with advantage to all concerned.

The Foundation's experience in research on fresh citrus fruits offers an example of advantage gained even though advancing technology has changed the objective. The meteoric development of frozen concentrated citrus juices has meant a decline in public cold storage of fresh fruits, with increase in freezing storage of the products. Prior to this large change, the Foundation had taken an active part in long-term studies on Florida oranges and grapefruit, Texas grapefruit, and California lemons in their areas of production and in a few receiving markets.

These studies were continued, in spite of some concern about the possibility that the objective had been lost or seriously reduced. But the new storage information has found use by the concentrate processors, who desire to extend their processing seasons and thus reduce costs. The processors can use the lower storage temperatures (30 to 32 F.) which protect juice quality beyond the time when rinds have lost some of their fresh appearance. The fresh-fruit shippers also gain some advantage, and the recent large expansion in production of citrus (oranges particularly) has the protection of more than one outlet.

The storage of frozen foods of many types is one of the major services of our industry and our responsibilities for frozen foods will unquestionably increase. Appropriately the Foundation has exercised leadership in urging and encouraging the creation of unique low-temperature facilities at the Western Regional Research Laboratory of the U. S. Department of Agriculture in Albany, California. The Foundation considers the time-temperature-tolerance studies under way in these facilities as very important—constituting a major sponsorship in the Foundation's program.

The group of projects that have dealt with atmosphere control and air purification in warehouse rooms has been a complex adventure. It might be argued that we have failed in our objective. So far as uncontested proof of the value of air purification in fruit storage with activated carbon is concerned, we are still in a dilemma. But with regard to advanced knowledge of atmosphere control and fruit volatiles, progress has been made indeed.

A half dozen State Experiment Stations have worked with the Foundation on air purification in apple storage. Other groups have joined in and have made important contributions, and Foundation-aided studies continue at Purdue University. The various studies have been stimulated to some extent by controversy and very healthful competition.

New Projects of 1953

For some years The Foundation has devoted major attention to frozen concentrated milk. Under direction of Dr. S. T. Coulter of the University of Minnesota it has been found that only temperatures well below 0 F. will be satisfactory for this process.

The choice between very low temperatures, well below customary levels for frozen foods, or higher temperatures with limited shelf life, has not proved attractive to those who have explored the field. Besides, a change on a large scale would involve industrial and economic problems, which would retard at present the commercial development even if the technical problems were solved.

During the past year some interesting observations have been made regarding the effect of slow freezing on concentrated milk and as a result another project on this subject has been cultivated at the University of Wisconsin under Dr. Walter V. Price. This project is exploring further the possibilities of slow freezing as a partial means, at least, of stabilizing the product at Zero F or slightly lower.

In pressing urgently for progress toward successful frozen milk products, the Foundation has in mind constructive help for the dairy industry and the program of the Secretary of Agriculture directed at improved marketing of dairy products. The present large stocks of stored butter are due, to some extent, to the impact of technological progress of competitive products. We believe that the right answer to technological challenge is aggressive research, rather than application of methods that create new and sometimes distressing problems of an economic nature.

Another important project initiated in 1953 is a search for a suitable moderate-cost instrument for measurement of relative humidities in freezer rooms. This difficult task has been undertaken by Dr. C. W. Thornthwaite at the Laboratory of Climatology of Johns Hopkins University at Seabrook, N. J.

A research grant for a study of frost heaving and the behavior of moisture in soils adjacent to refrigerated spaces was made to University of Minnesota. The investigations are directed by Prof. Richard C. Jordan and Prof. Miles Kersten. The American Society of Refrigerating Engineers has joined the Foundation in sponsoring this investigation with a research grant.

The problem of control of condensation, which is becoming more and more acute, spurred the Foundation to the establishment of two new projects and to the increased emphasis on the subject in a project at Columbia University under Prof. Carl F. Kayan. The two new projects were established at Georgia Agricultural Experiment Station under Dr. J. G. Woodroof and are entitled "Control of Condensation on Refrigerated Commodities and Containers" and "Prevention of Sugar Bloom on Refrigerated Candies."

The report also made mention of publication of Refrigeration Abstracts in cooperation with The American Society of Refrigerating Engineers.

Summary of Progress

Summarizing the events of the past year, the report lists the more important developments. These included publication of The Commodity Storage Manual, establishment of The Foundation Investment Fund with initial investment of $100,000, study of the control of cheese mites in small plants, study of the popping volume of popcorn, study of cold storage for onions, studies on humidity and cold storage of peanuts and pecans, study on refrigerated storage of oranges, study of Staphylococcus food poisoning, training conferences in cooperation with the National Association of Refrigerated Warehouses, surveys on floor maintenance and repair and removal of odors from cold storage rooms, survey of technical and trade literature.

During the past year a study by the U.S. Defense Transport Administration has indicated that by the end of 1955, about 12 million additional cubic feet of refrigerated storage space will be needed for military and civilian uses. Technical developments now under way may reveal that this estimate has been conservative. Frozen milk products and frozen baked goods could change it. The rapid growth of home freezers is an important factor (roughly estimated at about 10 million cubic feet per year), because it may mean that our homes will use many frozen and refrigerated commodities for which

(Continued on page 48)

Processing Pre-Cooked Frozen Poultry Products

HELEN L. HANSON,
Western Utilization Research Branch,
U.S. Department of Agriculture

THE precooked frozen food industry has expanded rapidly in recent years because of the demand for convenient, completely cooked foods that require only thawing or reheating. This demand has come from restaurant chains, air lines, hospitals, railroads, and the armed forces, as well as from the many recent purchasers of home freezers. It is desirable, from the viewpoint of the poultry industry, that poultry and eggs be utilized to the fullest possible extent in the preparation of precooked frozen foods.

Problems in freezing cooked foods concern the maintenance of flavor and texture during freezing and storage. Rancidity develops more rapidly in cooked frozen poultry, for example, than in uncooked frozen poultry. And in the freezing of cooked eggs, changes in the texture of the egg white presents a serious problem.

Our research efforts have been aimed at decreasing these defects. We found, in testing medium weight fryers, that precooking methods are an important factor in weight losses. Re-heating in the thawed or unthawed state also influenced weight loss after freezing. We found minor changes in the juiciness and tenderness of precooked frozen birds, which might not be recognized if birds were not compared directly with freshly cooked birds.

Storage stability varied somewhat with the type of precooking process used. We found little or no flavor change as a result of storage until after precooked frozen birds had been held for six months at 0 F. It might be well to use one precooking method for birds to be used by commercial or institutional concerns, and another for birds to be used in the home.

We have also studied precooked poultry products such as creamed chicken, creamed turkey, chicken and gravy, and chicken a la king. We found the liquid separation problem in the sauce or gravy could be overcome by using waxy rice flour as the thickening agent. Creamed turkey develops greater rancidity than creamed chicken. We found, however, that rancidity in frozen creamed turkey can be adequately retarded, if not completely prevented, by the presence of sufficient antioxidant during both cooking.

Summary of paper at Fact Finding Conference, Institute of American Poultry Industries.

Farm Surplus Increases

EVEN with flexible price supports and planned disposal programs, farm surpluses are expected to continue to increase over the next two years, according to a survey completed by the U. S. Department of Agriculture. The Commodity Credit Corporation now has about $6.3 billion tied up in surplus farm commodities of all kinds. This is expected to increase to $8 billion next year and possibly to as much as $10 billion in 1956, the experts say. Whether the surplus will begin to shrink after 1956 may depend on what kind of farm program Congress passes. The outlook for dairy stocks over the next twelve months are as follows, according to the survey:

	Present stocks (million lbs.)	Year from now (million lbs.)
Dried milk	400	650
Cheese	380	450
Butter	360	720

When it's a question of new refrigeration coils, it's no time to speculate on dependability or to compromise on quality. And where it's a question of assuring efficient, uninterrupted operation and low maintenance throughout the years —

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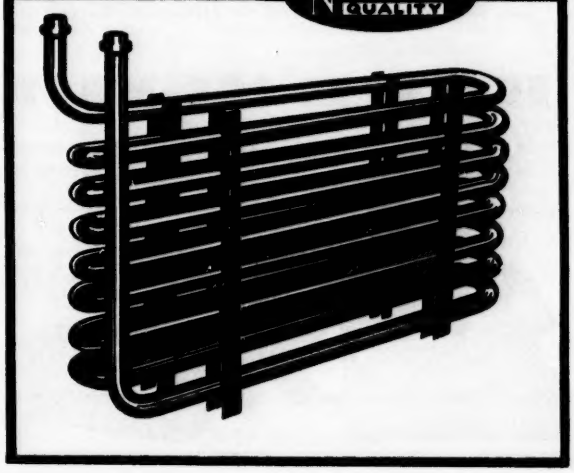


Wisconsin Ice and Coal Anniversary

THE Wisconsin Ice and Coal Company celebrated its 105th anniversary with a dinner Thursday evening April 29 at which executives of six nationally-known firms which supply it with coal, fuel oil and heating equipment were honored guests.

The affair at the Wisconsin Club was attended by some 55 people.

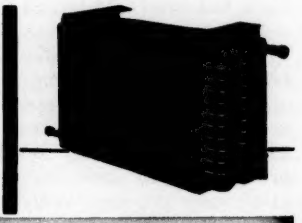
John H. Kopmeier, company vice president and a great grandson of its founder, addressed the group at the dinner. Mr. Kopmeier's son, age 9, is not a member of the company as yet, but his father thinks he might be an officer of it some day if everything goes well.

Three executives of major suppliers of Wisconsin Ice & Coal chatted with John H. Kopmeier at 105th anniversary dinner. The others are R. E. Salvati, Island Creek Coal Co., Huntington, W. Va.; W. D. Cross, Jr., Sinclair Refining Co. Chicago; and Claude A. Potts, Stewart-Warner Corp. Lebanon, Ind. (Milwaukee Journal Photo)

Two Kopmeiers Waldemar (left) and John H. (right) pose at anniversary dinner.

The Case of the Unwanted Thumbprint

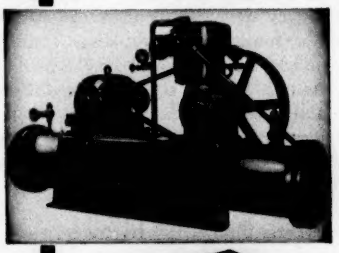
BY HOWE . . . THE WORLD'S CHILLER



John Q. Engineer studied his financial statement with dismay. "Could it mean that old "Dirty Thumb" Obsolescence is here in *my* plant? Yes, there are his prints all over my profit sheet!"

Startled, "J.Q." called in the Howe "private eye." Quickly they found the culprit hiding in the obsolete, inefficient refrigeration system. The unseen losses had been robbing "J.Q." *cold.*

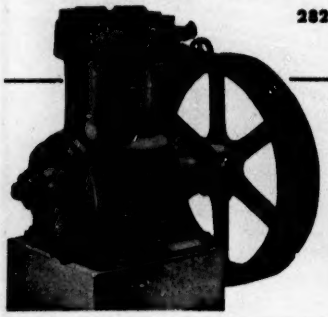
John Q. is purring like a kitten now! His new Howe equipment provides *exact* temperature and humidity at *all* times! It has cut risk of spoilage, assures better production, and keeps his products at profit peak. "The know-how of 42 years' specialization goes into those machines", said the private eye, hurrying to his next case.



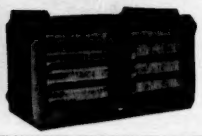
HOWE ICE MACHINE CO.

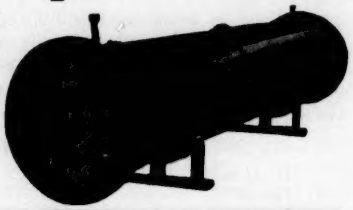
2829 Montrose Ave., Chicago 18, Ill., Cable: HIMCO—Chicago

DISTRIBUTORS IN PRINCIPAL CITIES



CONSULT HOWE on all your refrigeration problems. Since 1912 manufacturers of ammonia compressors, condensers, coolers, fin coils, locker freezing units, air conditioning (cooling) equipment. Immediate delivery!





New England Association Annual Meeting

THE annual meeting of the New England Ice Association was held Thursday, May 20, 1954, at the Kenmore Hotel in Boston. This meeting was held late this year to coincide with a scheduled regional meeting of the National Association of Ice Industries. The result was a very interesting and enlightening session. The meeting was well attended, with most of the progressive companies being represented. Every New England state was represented, with the exception of Vermont.

Guy W. Jacobs, National Secretary presented in graphic form the highlights of the National Association's accomplishments during the past year, and an outline of the general program of the Association. His discussion was accompanied with a number of slides, picturing such activities as channel icing, vending machines, and pictures of descriptive booklets, etc., still available at National Headquarters. Mr. Jacobs also described several new ideas of what other ice manufacturers are doing to promote the use of ice. While very few of the New England manufacturers are adopting these new ways of building profits, they are all adaptable in this section.

C. P. Austin presented some of the details of the experimental work going on at some of the colleges. He also described the work being done on channel icing by some of the large chains in the Midwest, also work being done by the poultry industry.

Following Mr. Austin's talk, the balance of the morning session was devoted to a very lively and most informative question and answer period.

At the afternoon session, officers were elected as follows:

President, Peter F. Hogan, Springfield, Mass.

Vice-Presidents: Leon Whitman, Brattleboro, Vt.; Louis Richer, N. H.; Warren Peirce, Mass.; George Breen, Providence, R.I.; Fred Murphy, Conn.; Watson Clark Rumford, Me.

Treasurer, Charles Larsen

Executive Secretary, Raymond T. Wilber, Providence, R.I.

The meeting was concluded with a round-table discussion. Mr. Peirce showed some very beautiful colored slides of ice punch bowls and carvings that he had made and used at women's meetings on Cape Cod. He commented on the tremendous amount of good will and interest that had come from this type of advertising. He also informed the group that the Cape dealers had entered into a newspaper and spot radio advertising arrangement, with each dealer contributing to the costs. Machine manufacturers, Walter Davis of York and George Voter were called upon to discuss engineering problems.

Mountain States Holds Spring Convention

THE 37th annual spring convention of the Mountain States Association of Ice Industries was held at the Brown Palace Hotel, Denver, Colorado, May 14-15, 1954.

After the introduction of L. L. Belcher as moderator, the first part of the convention was devoted to a presentation by National representatives, Guy Jacobs and C. P. Austin. The picture slides and the subject matter were forcefully and well presented.

After the presentation of the NAII material the scheduled program was fully covered. The subjects noted were all discussed and presented in round table fashion which undoubtedly is a much better and more interesting way for each one to grasp.

The only entertainment and party was one grand cocktail and dinner party at the Wolhurst Saddle Club, about twelve miles south of Denver on the road to Colorado Springs. The Mountain States Association took over the Club for this evening with approximately seventy-five present and formed a most congenial and entertaining party.

Frank W. Adams was presented with a bronze plaque upon the occasion of his 50th year of meritorious service in the ice business.

All the officers and directors were re-elected for the next year with one exception of William Goan of Billings. Mr. Goan is no longer active in the ice business and instead of his place on the Board, L. L. Baker of the Colorado Ice and Cold Storage Company was elected.

Annual Ice Convention Cincinnati — Nov. 9-12

THE ice industry, under the auspicies of the National Association of Ice Industries had such a good convention at Cincinnati in 1952 that they are returning there this year — November 9-12, at the Netherland Plaza Hotel.

Tentative plans are now being made for the business sessions and the entertainment program, both of which, it is promised, will be up to, if not surpassing those of previous ice conventions.

Southwestern Conferences

THE Waco ice sales meeing in April sponsored by the Southwestern Ice Manufacturers Association was attended by fifty-five Texas ice men who in three conference sessions played an interesting and profitable game of give-and-take with business building and profit making ideas. It was voted unanimously to give the Spring Sales Meeting a permanent place on the association calendar.

The National-Southwestern Association conferences in Houston and Dallas in May likewise were well attended. National Association President Paul H. Andres, Executive Secretary Guy W. Jacobs and Director of Marketing and Research C. P. Austin presented overall and detailed report on various and numerous activities and services of the National Association in its powerful, organized effort to keep the ice industry of the country on a profitable basis.

Then followed a management conference on Texas problems. Both sessions were very actively participated in by all present. Many attended such functions for their first time. Jodie Thompson ably led both sessions in off-the-record discussion of Texas ice men's everlasting problem to maintain profit through building business to offset competitive losses — through sound economies, through intelligent pricing policies.

Florida Ice Safety Record Improves

DURING the first three months of 1954, Florida ice plants have worked over one million man-hours and have reported 17 disabling injuries, or exactly 15.7 disabling injuries per million man-hours. During this same period last year, with slightly more man-hours worked, 64 disabling injuries were reported to the Industrial Commission for a frequency rate of 55.9 injuries per million man-hours. In other words, during the first three months of the ice industry's safety program, both the number of disabling injuries and the amount of time lost from work because of injury have been cut to less than one third of last year's losses. At this rate, accident costs this year will be more than two thirds less than last year's.

Missouri Ice Plant Sold

THE Slater Ice and Coal Company, Slater, Mo., was sold recently at auction to Frances Griggs and Bill Griggs for $13,500. The seller was John J. Davidson.

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

The Shift Engineer Has Big Job

His Skill Keeps Us Going

THE day of push-button operation, when an unskilled man anchored before an electric panel and with a shiny index finger syncronizes many operations, may never be realized at the Olympia Brewing Co. Olympia, Wash. No matter how electronic we become or what new shortcuts modern science may devise, in our complex business of brewing, aging and packaging Olympia Beer, there will always be a demand for many skilled hands. Of course, in our vast array of equipment you will see many near-automatic machines. But it's a long way from "push-button" as any shift engineer will tell you.

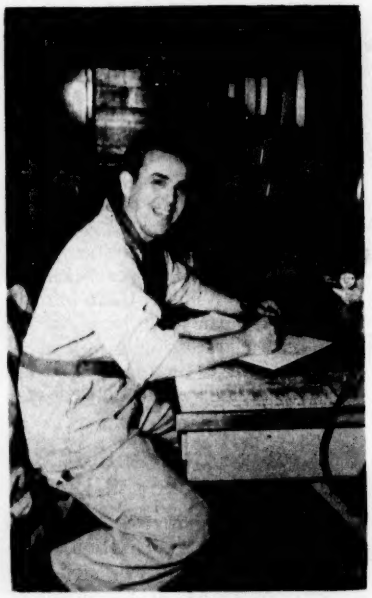
The responsible task of checking all equipment, reporting defective mechanism and in many instances executing critically fast repairs is divided among four competent shift engineers, thoroughly schooled in their field and well qualified to merit the trust we all place in them.

Shift Engineer a Doctor

Analogically, the shift engineer is a doctor with patients scattered on all floors of a huge hospital. He must visit each one twice in eight hours to check and record their heartbeat. If something is wrong, he must stay until he prescribes and administers a remedy, then work faster to regain a lost schedule.

To carry our comparison between the shift engineer and a doctor a step

Olympia Brewing Co. in "It's the Water" News, their monthly house organ featured an article on the operating engineers in their plants. NAPRE, perhaps couldn't claim that the start of the chapter in Olympia was responsible for this publicity, but its national officers and the editor of *Industrial Refrigeration* were very much impressed with the manner with which Scott Olmstead, Olympia's editor, described the importance of the refrigeration engineer and the details of his day's work. Here it is summarized.



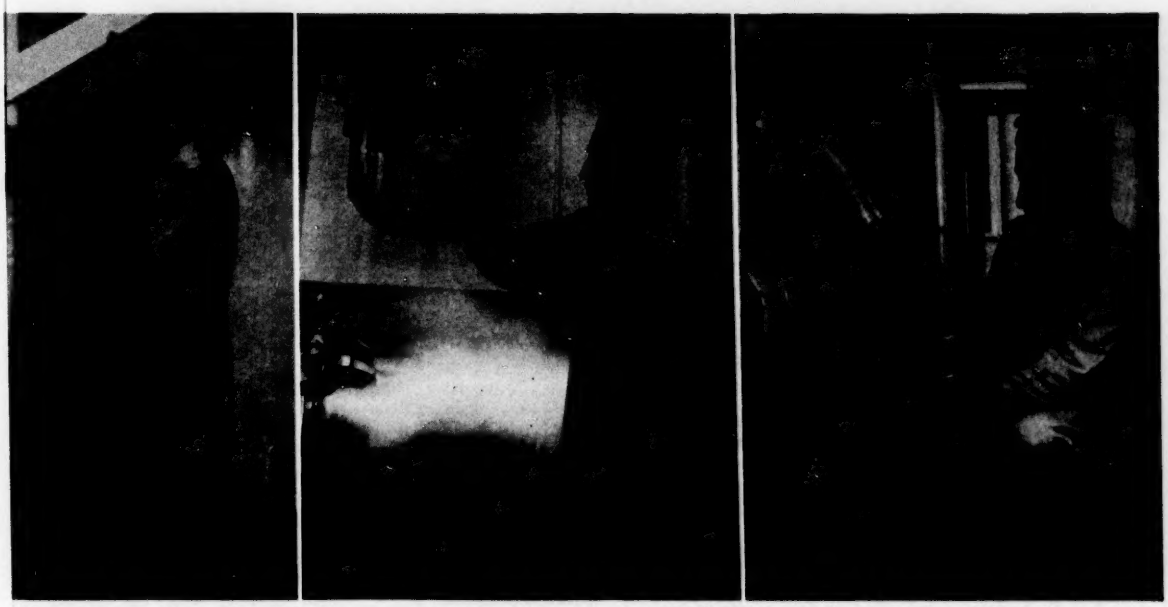
An accurate, 24-hour log is maintained by the four shift engineers, checked later by department heads Falconer (Andy) Anderson and Chuck Devine, then filed in the chief's office. Roy (Monk) Madison is logging refrigeration temperature readings of the many cellars.

Engineer's Day

8:00: Hang flag.
8:10: Take engine room readings.
8:20: Readings in "M" cellar.
8:30: Check yeast room.
8:40: Check "Freon" compressor room.
9:00: Check water pumps and engine room.
9:15: Start No. 1 air compressor.
9:25: Make 25 gaskets for cellars
10:00: Take engine room readings; change steam chart; start refrigerator round; check power valves.
11:00: Check Freon compressor room and cooler pumps.
11:15: Check sump and caustic pump; check government cellars.
11:25: Check bottlehouse air conditioners.
11:40: Check Diesel room, sterling heater, batteries, No. 1 water pump.
11:50: Log all readings.
12:00: Change flowmeter charts.
12:10: Lunch
12:30: Check engine room equipment and log readings.
12:40: Check "M" celler engine room.
1:15: Made 24 gaskets for "K" cellar.
2:00: Start last refrigerator round. 14 compressors with a total capacity of nearly 600 tons.
2:30: Grease and clean "M" cellar Wittemann.
2:45: "M" cellar refrigeration reading, engine room readings and change Wittemann chart.
3:00: Check yeast plant No. 2 water pump and more refrigeration readings: check "Freon" compressor room
3:00: Grease and clean No. 1 and No. 2 Wittemann. Add oil to ammonia compressor; change water in Wittemann; dump brine cans; check So-Lu Bridge alarm system attached to condensate line from the soakers, to detect sodium hydroxide content in water; check government cellar temperature; take Diesel room readings; grind in valve for cellars.
4:15: Wrote relief instructions on blackboard, changed clothes, and made out time card.
4:31½: Home to Mama.

EXECUTIVE OFFICE, NAPRE
433 N. Waller Ave.,
Chicago 44, Ill.
OFFICERS
President, L. J. Vivien,
New Orleans 22.
Secretary, J. R. Kelahan, Chicago 44.

Operating engineers of all refrigerating plants are invited to affiliate with the National Association of Practical Refrigerating Engineers, an educational association.

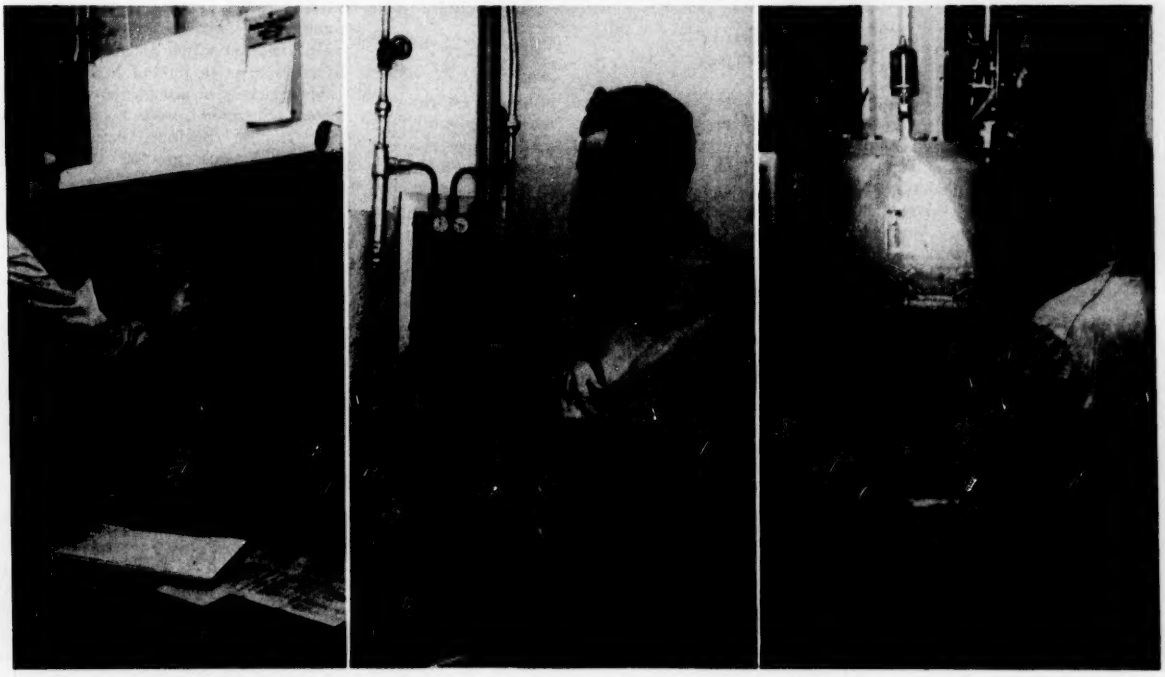


Above: One of three dozen thermometers Matt LaFontaine must check and record and log before he can eat). After lunch he'll do it again. Center: The shift engineer regularly changes steam flow and CO_2 charts. uated scale by his right shoulder is barrellage indicator for brew kettle. Right: It's a tight squeeze to check the vel in this particular freon compressor located on the half-deck of the new brewhouse. He checks 13 others, too.

her, our man checks and records thermometers twice while he is duty. If there is a fever or a l, the cause is given a thorough sical exam. The *doctor* keeps an ırate diary of his every move in a 24-hour log so *hospital* authorities can get a quick, accurate perspective of patient efficiencies.

The basic requirements of a good shift engineer parallels to a degree the inherent requirements of a good doctor; devotion to duty, alertness, the gift of being right (diagnosis and repair) which is the result of plenty of studious application. Keen observation is all important, and a sturdy pair of legs to withstand

Below: Important reminders for next shift engineers are chalked on engine room call board directly above log Center: Power's valve is a thermometer, switch and valve built in one unit; controls temperature of cellars by ating brine flow. Right: Shift engineer greasing innards of the Wittemann. This machine gets its strange name from the firm that builds them. It is used to compress CO_2.



lots of climbing and walking.

Technically, all of our engineers are operation engineers. But the internal breakdown at the plant, for expediency, classifies shift engineers, maintenance engineers and boiler-room attendants. All maintenance engineers, with the exception of the welding department, have worked through shift engineer positions. The maintenance engineer handles overhaul, repair and some installation. They work steady dayshift. The shift engineer rotates bi-weekly on his working hours. The operating engineers is a tightly knit department distinct from the rest of the plant but whose smooth operation is so necessary for our efficient production.

In order to get a clearer understanding of what constitutes a shift engineer's day, spend some time with him in the accompanying pictures of his rounds. You are sure to acquire the conviction that the shift engineer is a mighty important person around Olympia Brewing Co.

News Notes and Chapter Activities

Chicago

JOHN FORTI

THE meeting on May 11 was held at Maywood, Ill. Host for this meeting was Jack E. Watkins of J. E. Watkins Co., Watkins markets liquid return systems. This system works through a series of solenoid valves. Liquid collected in a suction trap is drained into another shell. At a predetermined level, hot gas is injected into the second shell, forcing the liquid out and back to the evaporator. Refreshments were served to the large group attending this meeting.

On May 25, George Anderson continued his review on Basic Refrigeration as our lecture course. This pre-meeting course was attended by an even larger group of younger members, eager to learn. New members admitted to Chicago Chapter at this meeting were: Alex J. Duffy and John P. Wagner, stationary engineers, Illinois Bell Telephone Co., and Stan J. Hess and D. F. Kress, maintenance mechanics, Cudahy Packing, active; John A. Heinzelman, Jr., Buildice Corp., associate member.

Gene Rytlewski took over the question and answer period. He stressed the fact that many members are always eager to ask questions before and after the meeting but fail to do so at the correct time, when other members may benefit by it and when other members' answers may be helpful. A movie prepared by Babcock & Wilcox was shown. This movie began with the birth of the boiler and turbine, and went down to today's most modern and efficient boilers for producing high pressure steam. Many questions pertaining to boilers were ably answered by Messrs. Walter Bergstrom and Gordon McLay of Babcock & Wilcox. The consensus was that the boiler industry is far advanced, comparable to the refrigeration industry.

St. Louis

KEN HOLIDAY

SOME of the best times we have are the occasions when we invite the ladies to meet with us. Such an affair was the annual installation of officers of St. Louis chapter, following a dinner May 14 at Town Hall. Past-president Charles Wunderlich installed the following officers, elected at the previous meeting: President, Stan S. Tatalovich, Swift & Co.; vice-president, Ed. C. Lotte, Griesidieck Bros. Brewery; secretary, Edwin P. Hughes, Millstadt Dairy, Millstadt, Ill.; treasurer, Charles L. Good, National Refrigeration Co.; sgt.-at-arms, Henry H. Proemsey, First National Bank; directors. John T. Dabbs, York Corp., Harold B. Suter, Les V. Fleiter Co., Eugene Kessler, Falstaff Brewing Corp., Sherman J. Merkel, Velvet-Freeze.

National Secretary and Mrs. J. Richard Kelahan were on hand. He spoke briefly to the group about President Eisenhower's safety conference from which he had just returned.

Thanks to Gene Bishop and Mrs. Bishop, who brought along their sound equipment and a suit-case full of their best records, people of all ages moved gracefully all over the place and had a wonderful time. Gene Kessler was official photographer and everybody tried to get in front of his camera during the Hokey-Pokey dance. The party broke up in good spirits at a respectable hour, with the intention of reassembling next November in New Orleans.

St. Louis Chapter officers: Lotte, Tatalovich, Hughes, Good and Dabbs. Outgoing Chapter President Dabbs is the National Membership Chairman.

Memphis

CHAS. CONLEY

(EDITOR'S NOTE: A change in printers brought an early closing date for May. Many chapter reports, received on the old closing date, were left out. Here is what Chas. Conley wrote about it: "I notice there wasn't any mention of Tennessee Chapter No. 1 in IR in the May issue. If you do that often the fellows who read it will think I am dead, since I have had for years fellows in all walks of life tell me they enjoy reading my news and seeing their name in print." Our regrets to Chas. and you other scribes, but that new pressman won't wait for us. We must now have your copy by the last day of the month.)

ON MAY 5, H. L. Todd, our instructor, continued the Basic Refrigeration Course, showing the group how to figure the capacity of booster compressors and second stage compressors, explaining why it was more economical to use two stage than one in very low temperature operations. The chapter will recess the educational meetings for June, July and August, holding only business meetings during these months, with the annual water melon party August 18. On May 19, Todd talked on pressure drop. He showed just how pressure drop affected the capacity of refrigerating compressors and other equipment.

Cincinnati

HARRY LEAGUE

ON MAY 18 an organizational meeting was held in Cincinnati at the Sinton Hotel. Clifford Hehn, chief engineer of the hotel, arranged the first meeting, assisted by Harry League and Joseph Kriemer. The national secretary, NAPRE, was on hand to acquaint some 59 engineers with the aims and objectives of NAPRE. Mr. Kriemer acted as master of ceremonies and Harry League secretary. Following the national secretary's talk, a question and answer session was presided over by Mr. Hehn, at which 41 engineers indicated their interest in joining NAPRE. Two of the engineers in attendance were Lewis A. Steel, Sheraton-Gibson hotel and Walter H. Harvey, Sealtest, both members-at-large. Another meeting is planned for July.

Seattle

CHET BERTUS

AT OUR MAY 20 meeting, James A. Callender, Callender Engineering Company, Seattle, presented a talk on the "Modern Trends in Cold Storage Construction". Mr. Callender has recently written a technical paper, "Should We Insulate Cold Storage Plant Ground Floors", which was published in INDUSTRIAL REFRIGERATION, June. He went into detail on his papers at the May meeting. Here the members had an opportunity to pick up some first hand information on cold storage construction and insulating ground floors from an author as well as an engineer. (Details of Mr. Callender's "Modern Trends . . ." were covered in a story on the Skagit Cold Storage in Jan IR, Page 13.)

Members-at-Large

LEROY ETZEL

HOW about some new members? You members-at-large have as good a chance as the chapter member to rope-in a new member each year. The quota set for our classification this year was 70 new members. We still have 48 to pull. Not doing so well, are we? Let's show these chapters that as a group of independents we will increase our standing by more than 100. Are you with us?

Now let's take one of our quickie tours to meet our brother engineers of this distinguished classification. Here's a 30 year man at Savannah, Ga. — Louise C. Roesel, Georgia Ice Company. At Arlington, Va., get acquainted with Roy E. Withers, Jr., Terminal Refrigerating & Warehousing Corp., and William Thomas Fitzgerald of Safeway Stores, Inc., Landover, Md.

In Hudson, N.Y., Floyd N. Vedder, a member-at-large, is in the Sales Department of Gifford-Wood Co. One of our newer members is William Gretz, III, vice-president of Production, William Gretz Brewing Co., Philadelphia, Pa. Coming west from Philly, a stopover at Altoona would give us a visit with Matthew F. Nieder of Caum Engineering Corp., and at Dayton, Ohio, we could call on L. O. Warner, president of his own firm.

It would take a long, but worthwhile hop north to see Carl Behning, chief engineer, Northern Cold Storage Co., Duluth, Minn., then back to Joplin, Mo., for a call on President J. E. Campbell of Miners Ice & Fuel Co. At Kansas City, Kans., we could pay a call on the Association Treasurer, Leland Kenagy, chief engineer, Railways Ice & service Co. (See, even our members-at-large rate national offices on a par with the chapters.)

At Omaha, Albert B. Schumaker is chief engineer for United States Cold Storage Corp. and John Nachtigall is engineer for Superior Ice Cream Co., at Superior, Nebr. Kester Johnson is engineer for the Farmer's Union Co-op Creamery and Roy G. Myers is owner of Nebraska Ice & Locker Service in Falls City. Out in Arizona there are some fine engineers, too. W. S. Mason, engineer of the Tucson Public Schools is a member of long standing. S. L. Cordis is general manager of Occidental Electric Co., at Nogales.

And now if you'll pardon my pride, here are a few of our engineers with Pacific Fruit Express — get acquainted as you travel back to Chicago: Allen J. Scott, plant manager and Duane Nordseth, shift engineer, Las Vegas, Nev.; A. W. George, manager, Sparks, Nev., plant; H. A. Shupe, manager at Pocatello, Idaho; and Paul S. Toay, plant manager, Samuel S. Scott, senior engineer, Floyd E. Dale, Ivan H. Smith and Cash Moraczewski, shift engineers, North Platte, Nebr.

Venemann Honored

One of our most illustrious members-at-large, Professor H. G. Venemann, was honored again, this time by his own colleagues in the Mechanical Engineering Department at Purdue University. On May 18, at a dinner affair in the Fowler Hotel, Lafayette, the professor's associates presented him with an embossed certificate of appreciation of his willingness to help his fellowman, his wit, and his continuing pursuit of knowledge of refrigeration. Of a real practical nature, they also presented him with a heavy sweater coat with the major letter "P" thereon — a letter earned in athletics years ago as a student. His buddies felt that this sweater, in Purdue colors, would be ideal for the professor's winter golf. (He shoots a mean 79!) Professor Venemann retired as a Purdue instructor on June 1.

Los Angeles

FRED HERR

PEACE time applications of atomic energy were outlined to members of Los Angeles Chapter, NAPRE, at the May 19 meeting in the Terminal Club by Charles Robbins, engineering technician of the Atomic Energy Research Department, North American Aviation, Inc. Mr. Robbins pointed out that atomic energy material now is used in food processing, medicine, power generation and various other phases of industry, and in a number of different ways. He treated the subject as broadly as he could within limits imposed by government. Mr. Robbins displayed an artist's conception of a sodium-graphite reactor for generation of electricity.

President Frank C. Eccleston initiated the following into membership: Robert R. Forbush, George E. Patterson, Harold L. Tate, Wilmot H. Turner and Raymond L. Catlin. An added attraction at this meeting was the showing by Larry Benecict of motion pictures he had taken at the 1953 national convention at Purdue University.

Frank Eccleston presided over a short business session on June 2, with Elmer Johnson pinch-hitting as secretary for Donald H. Byl. Albert E. Cockshutt of Adohr Milk Farms and Frank M. Berdeis of the Maier Brewing Co. were initiated into membership. Applications were received from Glenn Parsons and Frank M. Parry, both with Maier Brewing Co.

Elmer Johnson made a plea in behalf of the chapter's employment department, urging that this activity be developed into one of practical service to members seeking jobs. This could be accomplished, Johnson declared, if each member made himself an ex-officio member of the employment committee by recommending an unemployed member whenever he heard of an opening. Elmer Johnson also conducted the preliminary class on June 2, his subject being compressor calculations.

Piscatorial chairman Rudi Kettler reported that the first of six proposed deep-sea fishing trips was held on May 27 with 12 members participating. They went to the vicinity of San Clemente Island, some three hours off the coast of Southern California. Good fishing was enjoyed, Kettler reported, with Herbert H. Royden of the Royden Ice Co. winning the jackpot by hauling in the largest fish—an 18 pound yellowtail.

Yakima

ELMER TOOP

FOR the meeting on April 29, we toured through Welch's Grape Juice plant at Grandview, Wash. Two of our members, Howard C. Eagle, chief, and David Baily, engineer, were hosts. Oh! yes, we took our wives along. There were 25 ladies! The wives fixed us up a swell lunch and Welch's furnished all the grape juice we wanted to drink.

At the May 27 meeting, Clarence Curtis, industrial engineer, Pacific Power & Light Co., was taken in as a new member. Under new business, it was voted to have chapter officers draw up a resolution to send to this year's National Convention, asking that a convention be held in Spring of the year instead of Fall, so some of our members will have a chance to attend.

Detroit

LEO C. GAGE

THE meeting of May 18 began with a dinner at 6:30 p.m. and attracted the largest attendance of the season. The chapter was honored with the presence of George B. Bright, member of longest standing in our group, who flew from South Bend especially to attend the meeting. Mr. Bright now resides in Florida but makes occasional visits to Detroit. He was given the task of initiating two new members: John D. McCarver, Twin Pines Farm Dairy, and Harry Rice, Ira Wilson & Sons Dairy Co. For the benefit of the new and younger chapter members, Mr. Bright gave a short talk on the advantages of belonging to NAPRE.

A talk was given by E. P. Callanan, Michigan Ice Machine Company, on the subject "Construction and Inspection of Unfired Pressure Vessels — Starting from Mill Test Report to Finished Product". This was very instructive and impressed upon the members the desirability of having such inspected and ASME stamped vessels in their plants to assure safety.

Colton

HARRY BONTER

THE MAY 12 meeting was held at the Santa Fe ice plant lunch room, San Bernardino, Calif. After regular business, C. H. Purkiss acting in the absence of the president and secretary, introduced the speakers of the evening, Leroy E. Garrison and Percy Keith of W. P. Fuller & Co. The history of making paints, and the various kinds and applications of it, was presented on the screen by means of sound motion pictures.

Corpus Christi

RONNIE O'NEILL

ON JUNE 8 a Chapter was formed at Corpus Christi, to be known as the Texas Coastal Bend Chapter. Nineteen engineers signed the petition, with eight more expected at the first regular meeting, June 15.

NOTE: Quite a few answers to problems of the past few months have been contributed. Some are of exceptional merit. Therefore we are publishing a few this month in lieu of answers to Questions No. 1001-1005. Look for those answers in August.

Disintegration of Ice Conveyor Sprocket Teeth

QUESTION NO. 981: The excessive wear and short life of some manganese bronze sprockets and steel chain on an ice-conveyor were discussed, but no conclusion could be drawn for lack of sufficient information and data. Some suspicion was expressed that the foundry may have slipped up on the ingredients or proportions when casting the sprockets, while others questioned whether wear or stretch in the chain may not be responsible for the chain riding near the tips of the teeth and eating away the sprocket teeth.—A. F. Doneis.

ANSWER: I am no chemist, but this looks to me like a case of electrolysis between two dissimilar metals. Handling ice and being wet doesn't do it any good. I am basing my opinion on the fact that this can happen in boilers, why not here? Just why bronze sprockets are used is beyond me.—R.G.S.

EDITOR'S NOTE: In answering this question in the February issue, it was recommended that steel or cast iron sprockets be used, not because Mr. Ault thought of electrolysis, but because steel wore better.

Ice Adhesion Preventative?

QUESTION NO. 982: Do you know of a material or coating which when applied to a refrigerated surface, such as copper, will eliminate or at least minimize the adhesion of freezing water (ice) so that it can be removed under slight pressure? In our case the freezing surface is constantly kept cold and cyclical thawing is impractical.—T.K.

ANSWER: Coat the surface with silicone oil (in carbon tetrachloride solvent). Air dry for 24 hours or bake at 300 F for one hour. The metal surface should be clean before the coat is applied. The effect is independent of the thickness of the coat. Mechanical abrasion will remove the coat, otherwise it has a very long life.—W. L. Sibbitt, Purdue University.

QUESTION: What would be the result of complete air-drying only on the effectiveness and life of the silicone coating.—W.J.McC., Jr.

ANSWER: Air Drying gives the most effective coat but its life may be shorter than the baked coating. Toulene is a very good solvent to use if the surface is to be air dried. Its strength, if air dried, is 4 psia, and, if baked, is 8 psia.—H.G.V.

QUESTION: I am interested in acquiring more information regarding the use of Silicone oil. Particularly in the use of this oil in milk evaporators or condensers. I recall reading an article someplace referring to the use of silicone oil in tomato ketchup cookers with satisfactory results for reducing adhesion of the product to the cookers. I realize that milk products may be somewhat out of your line; however, I am hopeful that you can lead me to a source of more information regarding the use of this product.—F.P.Z., Wisconsin.

ANSWER: Silicon containing coatings have been developed for use on anodized aluminum ice cube trays and dividers. Anodized aluminum is especially tenacious in its adhesion to ice. These coatings are formed during chemical reactions directly on the anodized surfaces. These coatings are substantially permanent.

Silicon oil would not be as permanent a film former as the re-action formation made by using a primer coating and thereafter applying a latter coating of another reactive compound.

Silicon oils have been applied as form reducers in evaporators. They may help maintain a clean surface by eliminating the superheating of the foam but not by forming a permanent film on the metal surfaces.

Both Dow-Corning Corp. and General Electric Corp. can supply information on these compounds. Some are non-toxic; others have not been evaluated.—W.L.Sibbitt, Purdue.

NAPRE

Question Box

The National Educational Committee, NAPRE, answers monthly in this column, operating problems forwarded by members. The Committee appreciates answers from the field. Both questions and answers should be addressed to Prof. H. G. Venemann, 269 Littleton St., West Lafayette, Ind.

Automatic Control of Pear and Egg Storage Temperatures

QUESTION NO. 987: Is it considered advisable and practical to maintain temperatures of 31 F. in cold storage rooms containing eggs and pears, chiefly by means of fully automatic controls? We have been storing eggs for years and would appreciate information as to results obtained by automatic control of storage temperatures for eggs, pears, and other fruits.

ANSWER: The long time storage of apples and pears is our major problem in this area. As a general statement, our fruit is held in the producing area until it finally goes to market.

Over a period of many years we have given a great deal of thought to correct temperatures and humidities. For both apples and pears we have not designed our storage rooms with the thought of using automatic equipment for humidity control. We do use thermostats for automatic temperature control.

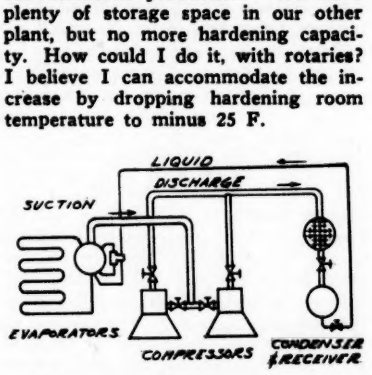
While we do not use automatic controls for humidity, it does not mean that we do not give serious thought to it. We most certainly do. Our approach to that problem (this is our own particular design basis) is to base our cooling surface for the precooling load (receiving period) upon the air leaving the cooling unit at 29 F. with a relative humidity of 75 percent and refrigerant at 16.5 F. This is the precooling condition where precooling and storage is in the same room.

After the entire room of fruit is precooled, the temperature differential between ammonia and entering air is reduced with the surface of the cooling unit remaining the same. This obviously raises the relative humidity of the discharge air. For long time storage of apples and pears, we aim at 85 or 90 relative humidity.

The temperature held for Bartlett and Winter Nellis pears grown in this area starts at 32 F. Bartletts are usually out by January 1. Temperature on Nellis is dropped after the first of the year to approximately 30½ F. Air circulation to obtain temperatures throughout the room is very important. Very few eggs are stored in this area and I can hardly pose as an expert on this commodity.—H.H.P., Yakima.

Increased Hardening Capacity for Ice Cream

QUESTION NO. 989. I read an article in Industrial Refrigeration, December, 1953, about rotary booster compressors. Our plant (ice cream) faces an expansion problem. I am able to get prices on building construction and additional machinery, but have to advise my employer as to whether we should drop our temperatures in the hardening rooms, or build an additional room to harden the increased production. We have plenty of storage space in our other plant, but no more hardening capacity. How could I do it, with rotaries? I believe I can accommodate the increase by dropping hardening room temperature to minus 25 F.



Existing plant consists of two 10 x 10 compressors which operate at 360 rpm, driven by two 125 hp synchronous motors. The system is a simple refrigeration system consisting of flooded pipe coil evaporators with an accumulator in the rooms, and the usual condenser, receiver, expansion valve, etc. We operate with 0 lb. suction and minus 28 evaporator. Discharge pressure is 185 lbs. with 96F condensing. Our room storage is

(Continued on page 40)

Proposed American Standard on Definitions

AS THE culmination of several years of extensive study, many conferences and correspondence, the Proposed American Standard on Definitions used in the refrigeration and air conditioning industry has been issued in reprint form.

This twenty-eight page publication, containing approximately 750 definitions of words, terms and phrases used by air conditioning and refrigeration personnel, forms Part D of the Proposed American Standard Refrigeration Nomenclature for Texts and Drawings, ASA Y53, of which the American Society of Refrigerating engineers is the sponsor. Parts A and B, Graphical Symbols and Abbreviations, and Part C, Letter Symbols, were printed and distributed four and three years ago respectively.

Work on Part D, Definitions, was begun about ten years ago, just previous to the organization of American Standard Committee ASA Y53, and since that time has been under discussion and revision of the Subcommittee on Definitions which, during that period, has had four Chairmen. The Subcommittee that finally produced the proposed Standard consisted of Professor Frederick J. Reed, Duke University, Chairman; Paul R. Achenbach, U. S. Bureau of Standards; and Professor Donald J. Renwick, Michigan State College.

The report has been approved by the ASRE Standards Committee and has been submitted to the ASA Y53 Sectional Committee, Gayle B. Priester, Consolidated Gas, Electric Light and Power Company, Baltimore, Chairman. Following approval by that body, it will be submitted to ASRE Council and ASA Standards Council for final approval.

The expressed objective of this proposed Standard is to provide authoritative definitions of words and terms used in all phases of activity connected with the air conditioning and refrigeration industry.

Among the sources drawn upon for the compilation of these definitions were: A glossary of some 600 words prepared by previous ASRE Committees and published from time to time in ASRE Data Books; definitions used in various ASRE Standards and Codes; definitions given in the Chapter on Terminology in the 1953 Edition of the ASHVE Guide; publications of various Manufacturers Trade Associations; and, finally, many words and terms suggested by a number of various sources, including Committee members.

It is the hope of the Definitions Subcommittee that this Standard, when finally adopted, will prove of great value to the industry in many respects, such as:

1 To bring about a more logical and consistent use of refrigeration terminology

2 To serve as an authority on word meaning in specification and allied writing

3 To compare meanings of closely related words

4 To be a vocabulary source for technical writing

5 To provide a classification system which may be useful in other aspects of refrigeration work

Ice Cream Company Sells Distribution Department

SALE of the distribution department of the Nacogdoches Ice Cream Company, Nacogdoches, Tex., has been made by the owners, R. G. Muckleroy and family to the Borden Company. The Nacogdoches Company serves 18 East Texas Counties spreading from Longview to Silsbee and from Crockett to the Louisiana line. The sale does not include the ice cream plant.

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REFRIGERATION ENGINEERING CO.

MONTGOMERY, MINNESOTA

(Continued from page 38)

minus 15F, and I believe that I have a total capacity of approximately 60 tons.—R.B.H.

ANSWER: It is impossible to advise you as to what additional compressor to install until further information is given.

(a) Capacity of ice cream freezer in gallons per hour.

(b) Maximum output of ice cream in gallons per day.

(c) Size of hardening room, length, width, height.

(d) Time required to harden ice cream in hours.

(e) Estimated tons capacity of other refrigeration loads.—H.G.V.

NOTE: The following additional information was received from R.B.H. in response to request.—H.G.V.

"My question probably wasn't clear enough. The plant on which my problem is based is used only for hardening purposes. Another plant adjacent to this building take cares of the freezer battery and the production department, plus other refrigeration services in the manufacturing plant. Another, a third, plant (across the street) is used for refrigeration of the ice cream storages prior to truck delivery.

"The subject plant of No. 989 was taken over on a lease and my company exercized their option to purchase. The Company's intention is to go to a second shift on manufacturing. My problem is what can I do to increase compressor tonnage to double present hardening capacity. Can I do it with a rotary pump, without increasing hardening room space.

"The present hardening room is approximately 40 x 50 x 10 feet overall. It has three doors, two walk-in and one pass. It is insulated with 9 in. of corkboard. The evaporator is a flooded pipe coil. When product is hardened it can be moved to the storage rooms. As a matter of fact, another pass door can be installed, and the product from the second shift moved in while that of the first shift is moved out."

ANSWER: In consideration of the above information the problem resolves itself into one of selecting a booster compressor of the rotary type that will double the present hardening capacity, and of deciding whether this can be done without increasing the hardening room space. Since R.B.H. states in his original question that he believes that he can accommodate the increase by dropping the hardening room temperature to minus 25 F., I will limit my answer to providing a booster compressor of sufficient displacement to double the hardening load with minus 40 F ammonia. He may have to add some coils.

TABLE 1—SUMMARY OF ALTERATIONS

Compressors:		
1 10 × 10 @ 360 rpm	125 BHP	Used as a spare
1 10 × 10 @ 360 rpm	125 BHP	Total 110 HP
1 A-250 Rotary	150 BHP	Total 150 HP
Operating conditions:	Liquid Cooled to 25 F	
Room Storage Temperature:	−25 F	
Evaporator:	−40 F	
Intermediate pressure:	32.5 psig	temp. 19 F
Rotary, tons:	112 tons	146 BHP
1 10 × 10 @ 360 rpm	Part of above tonnage	125 BHP
1 10 × 10 @ 360 rpm	Used as a spare only	125 BHP

Summation:

Room temperature lowered from −15 to −25 F — BHP increased from 151 to 271

Tonnage Increased from 57.6 to 112 — BHP/Ton decreased from 2.64 to 2.42

Note: One 10 × 10 @ rpm delivers 28.6 tons @ 0 psig and requires 75.5 Bhp @ 32.5 psig. Its capacity is 103 tons and requires 125 Bhp. The Bhp/Ton above is computed on basis of actual hp required and not on connected hp.

The present two 10 x 10 compressors operating without liquid precooling are delivering a maximum of 57.6 tons at 0 psig suction pressure. Of this amount about 53 tons represents hardening of the ice cream and 4.6 tons miscellaneous items such as heat leakage, lights, etc. Under the new conditions our total load of 112 tons will be made up of 106 tons for hardening and about 6 for miscellaneous items.

If we precool the liquid to 25 degrees and evaporate at minus 40 degrees, the refrigerating effect per lb. of NH_3, will be 545 Btu, and the lbs. pumped per min. will be

$$\frac{112 \times 200}{545} = 41.2$$

Assuming that the compressor has a volumetric efficiency of 85 percent its displacement will be:

$$\frac{41.2 \times 25}{.85} = 1210 \text{ cfm}$$

The second stage compressor will have to pump this 41.2 lb. per min. plus the flash gas required in the liquid pre-cooler, which will be about 7.0 lbs. per min., or a total of 48.2 lbs. per min. One 10 × 10 at 360 rpm has a displacement of 327.2 CFM, which with a volumetric efficiency of 88 percent when handling 48.2 lb. of gas, would give that gas a specific volume of 6.0 cu. ft. per lb. This would represent an intermediate pressure to be 32.5 psig which in turn will increase the Bhp on the booster from 111 to 146.—H.G.V.

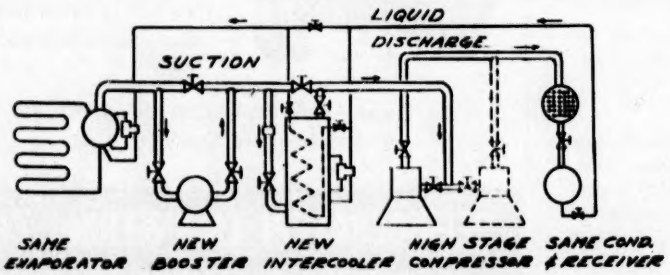
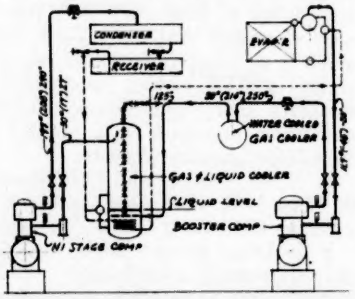


Fig. 2 — Plant plus rotary and intercooler

Compressor Operates With Superheat

QUESTION NO. 990: What could be causing my high-stage compressor to operate with approximately 50F superheat, almost 30F above recommended safe operating practice? Discharge pressure from the high-stage compressor sometimes exceeds 200 psig and temperatures are over 300F when suction pressure from the liquid intercooler is 30 psig.

Booster discharge is passed through water cooled desuperheater, and then into a 36-in. diam. x 10 ft. vertical liquid inter-cooler through the top, although this 8-in. line runs down the interior of the cooler where it tees into a perforated line under the liquid level. Discharge from the booster averages 250F and from the water cooler desuperheater at approximately 125F.



It appears that I am going to burn up the high stage compressor. Can you help me? (Degrees in parentheses on the sketch are what I believe should be my operating temperatures.)—J.F.

ANSWER: I understand that the temperatures in parentheses on the sketch are those which J. F. thinks should be the proper operating temperatures, while the others are his actual operating temperatures. With this in mind I wish to comment as follows: The temperature minus 45 F corresponds to saturated vapor at a pressure of 11.7 inches Hg, vacuum. Therefore, if the gas is entering the booster compressor at minus 20 F it contains entirely too much superheat. How-

ever this does not answer the major problem about the liquid and gas intercooler.

If the gas entered the second stage compressor at 17 F. its temperature at the end of adiabatic compression to 197 psig should be about 220 F. and not 208 F. If, on the other hand the gas entered at 27 F its temperature should be about 234 F, whereas the sketch shows it to be 290 F. In other words a 10 degrees difference in temperature at intake should make only 14 degrees difference at discharge. It is my opinion that the trouble lies in the compressor. Either it has been speeded up beyond its designed rating, thus causing unusual friction through valves and ports; or perhaps the discharge valve springs are too heavy, causing excessive pressure in cylinder and restricted flow.—H.G.V.

NH_3 Liquid Pump Vapor Binds

QUESTION NO. 994: Our plant has an ammonia receiver installed 18 inches off the floor in an old engine room over a buried exhaust steam line, still in use, which keeps the floor at a temperature of 125-150 degree F. The accumulator and liquid suction line are covered with brine thickness cork. The horizontal run of the liquid suction, which is 20 feet, pitches to the pump 18 inches and then drops the final 10 feet to a single stage pump. This installation worked satisfactorily up to 150 psig. discharge pressure. Above this pressure, flashing caused loss of suction.

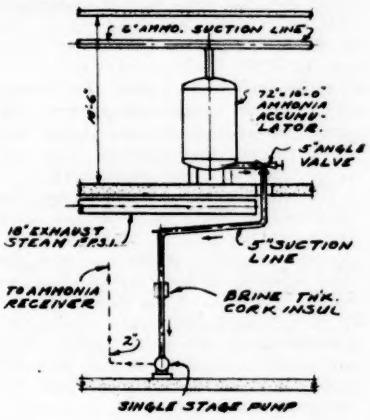


Fig. 1

We converted the liquid pump to two stage as it was necessary at times to pump against a discharge pressure of 225 psig. (Fig. 2) However, flashing between first and second stage created more volume of vapor and liquid than the second stage could handle. The pressure then built up between stages and when it reached approximately 150 psig., the first stage lost suction, so we are right back where we started. What would your recommendations be? — A.L.,

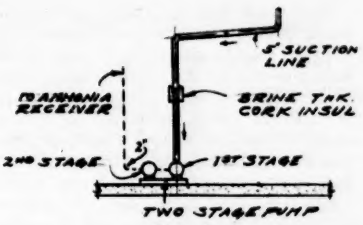


Fig. 2

ANSWER: In April IR, AL & HW solved their dilemma with the following hookup (Fig. 3):

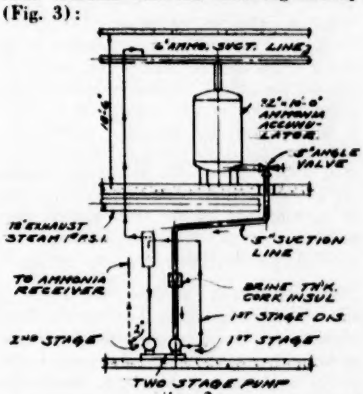


Fig. 3

Since then we have three more assists:

ANSWER No. 2. I have in the last year went through the ammonia liquid pump question by A.L. of Pittsburgh, as described in the March issue.

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Our plant had a York single stage liquid pump which handled liquid with a 4-foot drop to suction, a 14 foot lift to horizontal run of 30 feet, and then a drop of 12 feet into receiver. It pumped up to 200 lb head pressures for seven years. I replaced it with what I thought was an identical pump, a York, as the old one was wearing out. The new pump would not pump so we had to combine the old and the new pump into a 2-stage which works successfully.

I have since bought a York 2-stage pump and installed it. Eventually I will have a standby operation for protection. We have on our installation a gas leaker vent line, on the second stage between the check valve and discharge pump, the top of the riser. Also we have a 1-inch relief line from the suction side of the second stage pump to suction liquid trap with a stop valve and gauge, which we use to regulate pressure not more than 20 pounds per square inch higher than pressure in the suction liquid trap.—W. H. McCullough, Ohio.

ANSWER No. 3. I cannot see anything wrong with the pump hookup, in fact, almost any liquid pump should operate under these conditions. However, I am of the opinion that the pump which was installed as a second stage machine is not properly sized. It occurs to me that if it is necessary to use a two stage pump, then this feature should be embodied in one single machine, and not be split up into two separate units, unless recommended by the pump manufacturers.

The suction line to the pump is obviously well insulated, therefore, I can see no trouble arising from this angle.

It is possible that something could be done to eliminate a sizable portion of this slopover condition. I am not familiar with the physical layout of the plant in question, but we have found that by keeping a constant check on our low pressure float controls, for possible leaky float balls, improperly adjusted floats, dirty or worn seats, as well as giving careful attention to the proper adjustment to all thermal expansion valves and bulbs, we were able to eliminate about 75 percent of our liquid slopover troubles.—B.E.Smith, Minn.

ANSWER No. 4. The correct installation procedure for installing two stage liquid ammonia pumps is as follows: (Fig. 4)

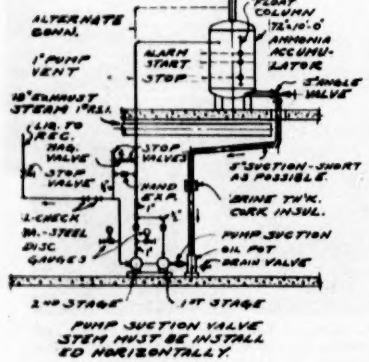

Fig. 4

The liquid drop leg from the accumulator or suction trap must be dropped lower than the pump suction connection. This lower portion of liquid leg is used to collect dirt and sludge, also for draining oil.

A minimum of 48 inches, plus friction loss, must be maintained between the pump stop level in the accumulator and the pump suction connection. This particular application has ample head.

The pump suction connection must be taken off the liquid leg above the lower portion of the leg. A hand stop valve should be installed in this line, with the valve stem in a horizontal position, to avoid a gas trap. A gas trap in this location will cause erratic and noisy operation due to gas binding of pump. This line should be short as possible with the least amount of bends for free flow. A strainer should not be used.

The pump discharge should rise vertically with a gauge installed in the rise. The discharge line is then run horizontally. Two 300-lb check valves with steel disc must be installed as shown, a hand stop valve, and thence to the h.p. ammonia storage receiver.

The low stage unit is sized large enough to maintain a positive pressure on the suction of the high stage unit and the excess liquid and gas is returned to the suction trap through the gas relief connections. Hand stop valves must be installed in the relief lines to throttle liquid flow and in that manner adjust the liquid pressure between the two units. A gauge must be provided ahead of the hand valve to determine intermediate pressure.

The intermediate pressure for the two stage pump should be set so that high stage pump neither crackles nor growls and pressure differential across low stage pump does not exceed 20 psi. The one-inch vent line must be tied into the accumulator. If no connection is available on the ASME shell, the vent may be tied into the suction line entering the accumulator.

To insure an easier start for the pump, and prevent gas binding, the pump discharge line is vented between the 2nd stage pump and the two check valves. The discharge line vent is tied into the pump vent with a normally open magnetic valve between. This magnetic valve is wired to close when the pump motor runs, and opens on a pump stop to automatically vent the discharge line. A hand expansion bypass valve is also installed and may be used in lieu of the magnetic valve for manual operation.

A careful study of the above sketch will show, that a two stage pump installation MUST be vented at three different locations, first stage, second stage and the second stage discharge line to the check valves. Gas binding of any sort will cause faulty operation of the pump.

Suitable grease must be used for pumps, according to the temperature of liquid ammonia being handled.—E.R.R. & J.M.F., Chicago.

Convention Activities for the Ladies

ON June 2, Dan Behre, Convention Publicity Chairman, announced arrangements to date for keeping ladies of NAPRE members busy and happy in New Orleans, Nov. 2-4, while the wage earner digs into some educational matters. Mrs. Leo J. Vivien, wife of the national president, heads the ladies committee. "From the looks of this", said General Chairman Addison Wegener, "the men will acquire a better vocation, but the ladies will have the vacation."

It is planned that the ladies attend the opening session—but after that, here's what's in store: Tuesday afternoon, tours through Vieux Carre; Wednesday, all day sight seeing, and shopping, around New Orleans with luncheon at a famous Creole restaurant; and on Thursday, there will be the Mississippi River excursion-boat picnic, but back in time to rest up for the annual banquet. There will be evening entertainment each day for the members and the ladies.

About the Vieux Carre, here's a bit of background, ladies:

During the French and Spanish dominations, which started in 1718 and ended in 1803, French and Spanish influences combined to develop the Creole architecture which is so characteristic of the Vieux Carre. In

New Orleans — A view through the iron grille of the lower Pontalba Apartment balcony, looking up Chartres Street. The St. Louis Cathedral, built during the Spanish regime, is in the center. On its left is the Cabildo, where the transfer of the Louisiana Territory from France took place in 1803. On its right is the Presbytere, or priest house, which with the Cabildo now houre the Louisiana State Museum.

that old section of the city, one can capture all the old world atmosphere of early New Orleans very much as it was more than a century ago. The straight, narrow streets lined with structures of a strange architecture, the fancy ironwork adorning the balconies, the mysterious looking alleys and passageways, the lovely patios and many other features contribute to a strange, exotic setting.

Then, in 1803, the Americans came and, ostracized by the Creoles, developed their own city above and below the Vieux Carre. Thus, in New Orleans can be found two cities with distinct personalities—one Latin and the other American; one old and one modern. The Latin city is to be found in the Vieux Carre. With the exception of certain sections along the fringes which have been commercialized, the entire quarter is noted for its old homes and buildings of quaint architecture and is famous for its old-world atmosphere and romantic tradition.

The French and Spanish inhabitants of early New Orleans were proud of their Latin heritage and resentful of any attempt to impose a new system upon them or their city. Thus, when Louisiana became part of the United States in 1803 and there came a great influx of Americans with different customs and a different language, conflicts were bound to arise. The Americans, in turn, formed a colony of their own and what was virtually a different city developed on the opposite side of Canal Street which still divides the old city and the new.

Frozen Lemonade Increases

DEMAND for frozen lemonade hit a new high during 1953. The output jumped 60 percent over the previous year, the Department of Commerce reported. Total production during the year was 91,000,000 pounds, the department said. Production of frozen concentrated orange juice increased 8 percent with a total output of 535,000,000 pounds.

Norway Fish Freezing Plant

A FISH center costing $3,780,000 has been opened at Bergen, Norway. It is a six-story building with more than 250,000 square feet of floor space. There is a freezing capacity for more than 12,000 tons of fish, an ice plant with ice-making capacity of 200 tons a day and a special department where live fish can be kept.

ARI Standards Published

PUBLICATION of the first set of ARI Standards has just been completed, according to an announcement received from the Air-Conditioning and Refrigeration Institute. This edition includes thirty-one individual standards covering a wide range of air-conditioning and refrigeration products.

Of particular interest is tentative Standard 6-10, Application Engineering Standard for Year-Round Residential Air-Conditioning, which includes the Institute's recommendations for calculating residential cooling loads. Other standards cover: Room air-conditioners, self-contained air-conditioners, compressors and condensing units, heat transfer products, and central-station air-conditioning and refrigeration equipment.

While the newly-published standards are the first to bear the ARI name, most are revised editions of standards previously published by ACRMA and REMA, predecessors of ARI.

The Institute is carrying on an extensive standarization program and will publish new standards, as well as revisions of existing standards.

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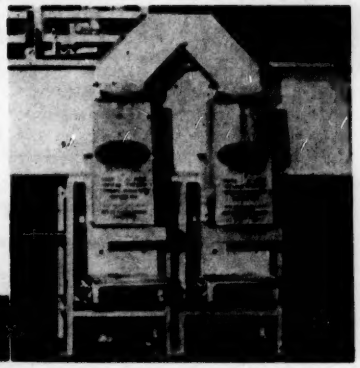

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Frozen Food Pack Shows Increases

THE production of frozen foods, both fruits and vegetables, shows a considerable increase for 1953 over all previous years, according to statistics compiled by the National Association of Frozen Food Packers.

The grand total of all fruits was 541,960,641 pounds compared with 420,303,232 pounds in 1952 and 415,944,546 pounds in 1951.

The grand total of all vegetables was 1,076,578,353 pounds compared with 895,718,571 pounds in 1952 and 770,038,311 pounds in 1951.

Red tart cherries, grapes, prunes, and loganberries especially showed big increases, while apricots, sweet cherries, and peaches showed decreases.

Green and wax beans, brussels sprouts, and cut corn showed increases, while pumpkin and squash only showed appreciable decreases.

The following tables show production by years and product. The data given are for the commercial pack and do not include quantities produced in frozen food locker plants.

TOTAL FROZEN FRUIT AND VEGETABLE PACK BY YEARS

Year	Fruits Pounds	Vegetables Pounds
1942	194,643,105	152,512,470
1943	187,266,859	207,871,993
1944	323,886,354	237,092,417
1945	427,037,945	307,977,360
1946	519,092,956	450,000,203
1947	343,519,846	346,208,097
1948	369,722,641	446,357,533
1949	354,020,662	563,498,997
1950	472,173,104	587,101,353

New Freezing Plant

A LARGE modern freezing plant is being built by Pictsweet Foods Inc., Mt. Vernon, Wash. at San Jose, Calif. The new plant will provide production capacity of about 35 million pounds, with provisions for future expansion.

Pre-Cooked Fish Sticks

BREADED pre-cooled fish sticks have achieved a phenomenal consumer acceptance with the Fish and Wildlife Service predicting a 30 million pound production figure in 1954. Production in 1953 was 7,262,000 lbs. Consumer acceptance was so high that late in the year processors were having difficulty keeping up with orders. . . . Frozen foods will capture 15 percent of the consumer's food dollar by 1960, said George Mentley, general manager for Birds Eye, at the Central States Frozen Food Association meeting. Frozen turkeys, complete with stuffing, have now been developed by the Cryovac division, Dewey & Almy Chemical Co.—Cold Facts.

New Frozen Food Plant

A FROZEN foods plant is being planned by The Frio Frozen Foods Inc., a local stock corporation, El Paso, Texas. Completion of the plant will encourage truck farming of vegetables for which marketing facilities have not been adequate.

PACK OF FROZEN FRUITS BY PRODUCT

Product	1951 Pounds	1952 Pounds	1953 Pounds
Fruits:			
Apples & Applesauce	28,771,823	37,648,864	42,355,751
Apricots	9,868,584	4,155,207	3,962,453
Cherries, Red Tart	99,281,673	61,866,777	115,241,575
Cherries, Sweet	2,250,547	2,411,498	1,739,055
Grapes & Pulp	4,798,578	4,937,172	10,109,933
Peaches	32,380,150	35,454,390	32,170,960
Prunes	6,791,397	3,588,065	8,356,212
Berries:			
Blackberries	14,573,987	10,628,449	17,965,976
Blueberries	13,920,999	9,848,208	13,987,828
Boysenberries	9,309,409	9,683,397	9,705,717
Currants	1,505,216	2,942,872	3,794,161
Gooseberries	136,080	95,557	131,882
Loganberries	2,419,196	1,795,022	2,303,115
Raspberries, Black	9,559,151	9,002,895	8,974,588
Raspberries, Red	19,413,645	18,365,383	24,895,385
Strawberries	157,728,674	200,301,839	225,962,537
Youngberries	145,582	*	*
Miscellaneous Fruits & Berries	3,089,855	7,577,637	20,303,513
Total	415,944,546	420,303,232	541,960,641

*Included with total for miscellaneous fruits and berries.

PACK OF FROZEN VEGETABLES BY PRODUCT

Product	1951 Pounds	1952 Pounds	1953 Pounds
Asparagus	23,561,803	25,460,043	32,945,017
Beans, Green and Wax	81,650,454	87,438,169	114,780,576
Beans, Lima	108,020,229	113,926,153	138,594,897
Broccoli	48,767,804	82,253,181	89,042,671
Brussels Sprouts	22,475,732	22,454,197	40,801,491
Carrots	10,572,945	22,269,107	29,331,684
Cauliflower	22,427,692	33,165,757	35,709,895
Corn, Cut	44,548,510	62,683,636	104,809,364
Corn-on-Cob	8,771,971	14,196,021	17,217,147
Mixed Vegetables	26,088,444	26,471,606	30,910,006
Peas	195,540,613	203,725,900	222,543,301
Peas and Carrots	12,946,615	18,033,334	23,671,534
Pumpkin and Squash	12,723,211	15,068,076	9,472,482
Rhubarb	5,803,090	5,684,418	8,348,507
Spinach	97,878,104	91,463,973	87,927,229
Succotash	11,913,174	11,768,828	14,189,791
Miscellaneous Vegetables	36,347,920	59,656,172	76,282,761
Total	770,038,311	895,718,571	1,076,578,353

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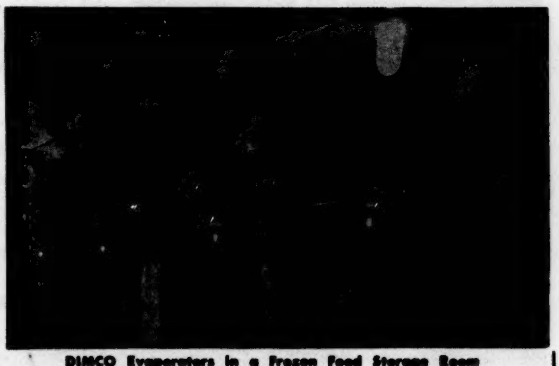


DIMCO Evaporators in a Frozen Food Storage Room at great Lakes Terminal Warehouse, Toledo, Ohio. A typical installation facilitating palletizing.

Poultry Institute Adds To Research Council

AN ENTIRELY new working set-up and a broadened membership for the Institute of American Poultry Industries' Research Committee has been announced by Cliff D. Carpenter, Institute president.

Dr. George F. Stewart, head of the poultry department at the University of California, will serve as chairman of the group, which will now be known as the Institute's Research Council. Fourteen new members have been appointed, bringing the total membership of the Council to 49.

There are four main Divisions of the Council, with a separate chairman for each: 1—the Shell Egg Division, 2—the Egg Products and Byproducts Division, 3—the Poultry Meat and Byproducts Division, and 4—the Farm Production Division.

Three Committees are already operating under the Egg Products and Byproducts Division, each with a specific assignment: 1) the Standard Testing Methods Committee, 2) the Salmonella Committee, and 3) the Ultraviolet Committee.

Under the Poultry Meat and Byproducts Division there are two additional Committees, each working on a particular project: 1—the Packaging Committee and 2—the Sanitation Committee.

"This type of setup will save time for the Council members," Dr. Stewart commented, "since many of them specialize in certain fields and have a direct interest in only part of the Council's activities."

USDA Disposes of CCC Owned Butter

THE U. S. Department of Agriculture has announced the awarding of contracts for the repackaging of 3,456,000 pounds of Commodity Credit Corporation owned butter, for the reprocessing of 4,500,000 pounds of CCC-owned cheddar cheese, and for supplying 6,648,324 pounds of nonfat dry milk, all for distribution under Section 32.

The butter will be repackaged into 1-pound prints by A. Strum and Sons, Manawa, Wis., at a cost of 1.225 cents per pound.

The cheese will be reprocessed by the following concerns and at the following costs:

Swift and Company, 1,590,000 pounds at 2.60 cents per pound, delivered at Green Bay, Wis.

Hygrade Food Products Co., 1,080,000 pounds at 2.59 cents per pound, delivered at Shelbyville, Ill.

Wilshire Cheese Co., 900,000 pounds at 2.55 cents per pound, delivered at Springfield, Mo.

A. Strum and Sons, 2,500,000 pounds at 2.5 cents per pound, delivered at Fremont, Wis.

Central Cheese Co., 180,000 pounds at 2.58 cents per pound, delivered at Marshfield, Wis.

The nonfat dry milk will be supplied by the following concerns and at the following prices:

A. Strum and Sons, 2,500,000 pounds at 17.52 cents per pound, delivered at Manawa, Wis.

North Star Dairy, 2,400,000 pounds at 17.38 cents per pound, delivered at Browerville, Minn.

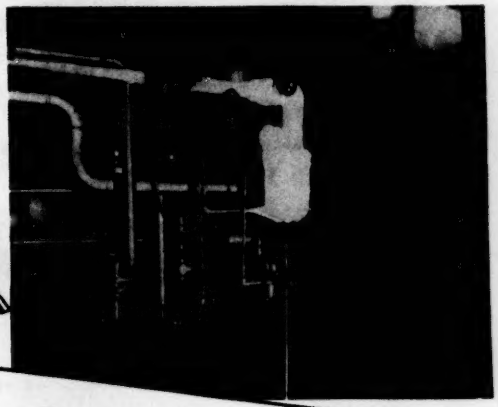
Weldon Farm Products Inc., 1,100,000 pounds at 17.48 cents per pound, delivered at Juneau, Wis.

Land O'Lakes Creameries, Inc., 658,324 pounds at 17.64 cents per pound, delivered at Minneapolis, Minn.

This brings the total of these products distributed under the Section 32 program since July 1, 1953, to 74,819,000 pounds of butter, 47,751,000 pounds of cheese, and 34,596,224 pounds of nonfat dry milk.

PURGING BY HAND?

WHY NOT CHURN YOUR OWN BUTTER?



Today's methods of making butter have put the old fashioned butter churner out in the barn forever. Purging refrigerant by hand is just as outmoded because an Armstrong automatic forged steel purger will do a more thorough job without wasting a lot of costly refrigerant. When head pressures go up, the engineer merely turns the purger on, then turns to more important and profitable work. In the meantime the purger gets rid of all noncondensable gases in the system.

The result is: You save time and refrigerant and get much greater refrigeration capacity. You lower your power costs and cut cooling water consumption.

Send for Bulletin No. 221. Learn how to cut your refrigeration costs and get more capacity from your refrigeration system.

ARMSTRONG MACHINE WORKS
860 Maple Street • Three Rivers, Michigan

The Proof is in user reports:

★ **$225 AMMONIA SAVING THE FIRST YEAR—** Velvet Freeze Inc., Kansas City, Mo.

★ **POWER COSTS CUT 20%—** Rubenstein & Son Produce, Inc., Dallas, Texas

★ **COOLING WATER CONSUMPTION CUT IN HALF—** Producers' Dairy Co., Brockton, Mass.

★ **HEAD PRESSURE 50 LBS. LOWER—** Mayo Hotel, Tulsa, Okla.

★ **ALLOWS TIME FOR DUTIES ELSEWHERE—** engineer at Alta Vista Creamery, Fort Worth, Texas

★ **PURGER PAID FOR ITSELF IN 30 DAYS—** Dalton Ice Co., Dalton, Ga.

ARMSTRONG PURGERS

Guaranteed to satisfy

Electronic Food Processing Plant in California

A NEW company has been formed at Walnut Creek, Calif., for the processing of fresh meats, vegetables and fruit by electronic radiation to perform the service now supplied by refrigeration, according to a news report. The company is the Applied Radiation Corp., and is headed by four scientists. A new type of electron linear accelerator is being built which is simpler, smaller, lighter and less expensive than those now in operation. It will probably cost $100,000. The machine is calculated to weigh about 2,000 pounds and to require space only four feet. It will be ready for testing in September.

The scientists-businessmen say that radiation not only destroys bacteria, but in sufficient strength interrupts enzyme action. Food preserved in this fashion loses "none of its natural flavor or fresh state nutrition qualities," they say.

Officers of the company are Morris R. Jeppson, president, David Garbellano, vice president and Dr. Richard Post and Dr. Hayden Gordon, consultants and directors. Mr. Jeppson and Garbellano, formerly were employed at the University of California Radiation Laboratory and the other two are still employed there.

Other directors and the company's financial sponsors are: William W. Barton, president of the W. F. & John Barnes Co., of Rockford, Ill., prominent firm in the machine tool and food processing machinery fields; J. Marus Hardin, Oakland attorney and president of Lyco Machine Works and Walter Lynch, executive vice president of Lyco.

Two years ago, scientists at the University of Michigan and at Massachusetts Institute of Technology discovered that food treated by radiation from radioactive materials could be kept without refrigeration. But the danger and difficulty of handling radio active substances and the high cost, prevented commercial application.

As a result of further research and the new machine, radiation can now be controlled it is claimed. The cost of preserving food by this process ultimately may be less than the cost of preservation by quick freezing. It will Mr. Jeppson said, do the job of cold sterilization.

The Applied Radiation Corp. was organized to build the machine and to continue research in the field of applied electronic radiation.

Editors Note: For a more complete discussion of this new process of food irradiation, see paper in this issue "Food Preservation by Use of Irradiation" by Dr Bernard E. Proctor, Massachusetts Institute of Technology.

Semi-Annual ASRE Meeting in Seattle

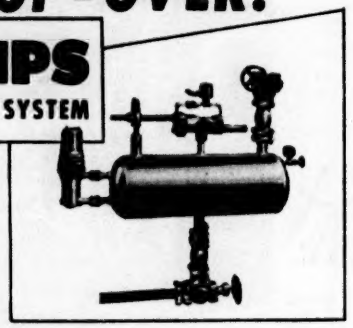
THE 41st semi-annual meeting of The American Society of Refrigerating Engineers will be held at the Olympic Hotel, Seattle, Wash., July 11-14. Extensive and colorful attractions are planned by the Pacific Northwest Convention Committee. The usual technical sessions, conferences and discussions will provide a well rounded business program.

New Cold Storage Plant

A NEW cold storage plant costing more than $100,000 will be built at Ferndale, Wash., to augment the food freezing and processing facilities of Kelley Farquher & Co.

NO SLOP-OVER!

PHILLIPS
LIQUID RETURN SYSTEM



● SAFEGUARDS Compressors

● ASSURES Economical Operation with Full-flooded Coils

Here's the proved method of protecting ammonia compressors from the damages of liquid slop-over. Phillips Liquid Return Systems effectively return refrigerant liquid from a suction line trap to the liquid receiver or liquid line—and, effect savings in operation. With a Phillips System, full flooding of coils is possible for maximum efficiency of evaporation and properly-conditioned suction gases are assured.

PHILLIPS FLOAT CONTROLS
For "Freon"— 1 to 1000 Ton Cap
For Ammonia— 1 to 2000 Ton Cap

Several types of systems are available: for Gravity, Injection Lift and Pressure Lift operation, in sizes up to 1000 tons. A Phillips Engineer will gladly help to select the right one to assure complete protection for you. Write today for full information in Bulletin LRS-50.

H. A. PHILLIPS & CO. DESIGNERS AND ENGINEERS REFRIGERATION CONTROLS SYSTEMS
3255 W. CARROLL AVENUE • CHICAGO 24, ILLINOIS
REPRESENTATIVES: THE C & S EQUIPMENT CO.
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A Handy Tool - WRIGHT'S HEAD-BACK PRESSURE CALCULATOR

Actual Size 3½ in. square

The Head-Back Pressure Calculator quickly determines the proper head pressure, for various refrigerants when the suction pressure, room temperature or mean water temperature is known.

Such variable conditions as the suction pressure, room temperature, water inlet and outlet temperature, kind of gas used, etc., all enter in determining the proper head pressure.

Post Paid $1.00

NICKERSON & COLLINS COMPANY
433 N. Waller Ave CHICAGO 44, ILL.

Butter Offered For Recombining With Milk

THE U. S. Department of Agriculture has announced a program to facilitate the use of U. S. produced butter or butterfat in recombination with nonfat dry milk solids from U. S. production for sale as liquid milk in approved friendly countries.

The USDA will offer butter from its inventory for sale on a competitive bid basis. The purchaser will either export the butter or an equivalent quantity of butterfat. Since the butter in the USDA inventory contains salt, which is not desirable for this process, and commercial practice is to use butterfat only from selected sources of cream, the program permits the butter purchased from the USDA to be marketed in domestic trade channels provided an equivalent quantity of U. S. produced butterfat is exported.

The butterfat and nonfat dry milk solids will be recombined into fluid milk in the foreign country by mixing in correct proportions with water. This process is being used successfully at present in supplying whole milk from butterfat and nonfat dry milk solids in Japan.

Butter Production Heavy

BUTTER production still is heavy, despite the lower price support level. In the first three weeks of April, the Federal government had to add about 2.2 million pounds of butter to its holdings, even though the propping price had been cut from 66 cents a pound to 58 cents. Butter continues to be made at a rate roughly one-fourth above the 1948-52 average. Consumption has picked up much less sharply than was expected when the retail price was cut. The reduced support price will be attractive to butter-makers as long as milk is in record abundance.

Air Conditioning in Houston Food Stores

THIRTY food stores in Houston, Texas installed air conditioning last year, the city's Chamber of Commerce reported in its annual survey recently. This is about one-third greater than 1952, when 22 stores put in air-conditioning. Since the organization began keeping detailed records in 1946, nearly 200 food stores have reported air conditioning installations.

Book Review

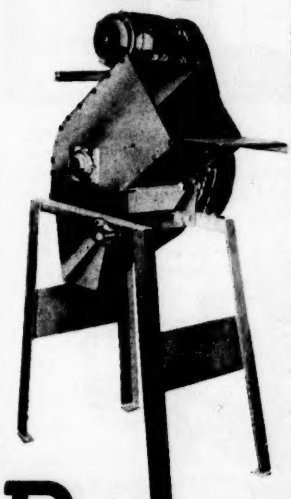
HEATING, VENTILATING AND AIR CONDITIONING GUIDE for 1954. Published annually by American Society of Heating and Ventilating Engineers. 1616 pages. Illustrated. Price $10.00. For sale by Nickerson & Collins Company, Chicago, Ill.

This 1954 edition has new special features, one of which is a new chapter on residential summer air conditioning, including new data on methods of obtaining local relief in hot humid environments, new information on recent developments in air and gas cleaning, new tables on steam requirements of process equipment, and more detailed data on characteristics of pipe and tube.

Recent Society research has been used as a basis for extending the data on the effect of shading of glass and for improving the rewritten chapter on Air Distribution. The Technical Data Section has been enlarged to 1,128 pages, representing an increase of 32 pages over the previous edition. The Manufacturers Catalog Data Section of 486 pages, illustrates the products of 319 well-known manufacturers. An Edge Index is a new feature.

Regal MODEL 25

ICE CRUSHER



The New REGAL Model 25 has all steel frame legs, grate handle and grate. Self-aligning ball bearings. Legs high enough for 25-lb. paper bag to be filled. Galvanized for the prevention of rust. ¾ HP. motor. Direct drive, no gears. Shelf for placing ice on before entering hopper. Slanting hopper for easy loading. Four grate adjustments by turning the handle on side of crusher. Makes a very good fine ice on grate closed. Will take long 50-lb. blocks in hopper. Two belts for sure pulling power. Belts and motor pulley furnished when crusher is ordered without motor. Delivery can be made on receipt of order. Guard covers the flywheel and motor pulley.

Price $149.00, less motor. Motor at prevailing price.

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Bateman

Ice Processing Equipment

MINERAL WELLS, TEXAS

SHANK

AMMONIA VALVES AND REFRIGERATION PRODUCTS

RELIEF VALVES

For Ammonia and Freon. One Piece body design—rustproof finish. Internal construction—stainless steel—will not corrode. Positive relief action. Pressures from 75 to 400 lbs.

3-WAY DUAL SHUT-OFF VALVE

For use where Refrigeration Codes require dual relief valve installations. Stainless steel stem. Indicator plate on hand wheel shows position of valve shut off. Completely rust-proofed.

See your jobber—or write us for prices.

CYRUS SHANK CO.

4650 W. 12th Place, Chicago 50, Ill.

Will Insulation Prevent Frost Heaving of Floors

(Continued from page 16)

A new client has an original plant which gave trouble by heaving. The building was only 40 feet wide, but on very damp soil and no external source of heat. The floor and interior columns raised eight inches after several years of operation. The ice was melted with hot water coils and the floor sunk several inches below its original level.

On-Grade Floor Slabs An Engineering Specialty

Refrigerated buildings that have been damaged by improper underfloor design are innumerable. Damage occurs in dry locations as well as the damp areas. Many buildings have required extensive repairs, and others are standing vacant, or changed to a different usage.

There is no one answer to floor and under floor design, all buildings and building locations are different, and plant operations are different. Each requires its own individual study by trained and experienced engineers for the protection of the plant and its economical balance of operational and investment costs.

However, there is one thing for sure, ice must not be allowed to form under the structure.

TRRF Annual Report

(Continued from page 30)

the benefits are moderate rather than essential. If the product is available frozen, the homemaker may prefer it frozen because of the increased convenience and fresher quality.

Included in the report were a list of articles and speeches from aided projects and the Director's office, a list of grants-in-aid for various projects active in years prior to 1953, a complete list of projects active in 1953, a list of institutions where short-term investigations are carried on, officers and other personnel and sustaining members of the Foundation.

New Refrigerated Cargo Service

(Continued from page 21)

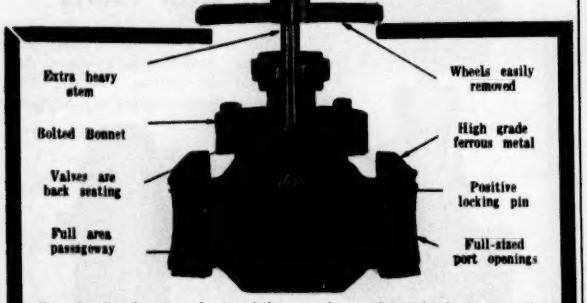
is provided with double booms, each with 3 tons capacity. No. 1 and 2 hatches have electric-hydraulic winches, and No. 3 has electric winches. Fifteen insulated hatch plugs 4 x 8 ft. and 8 inches thick are used at upper deck level. These covers are made of plywood, with a new style insulation, they are light enough to be easily handled by one man. After being secured they are covered with waterproof canvas. Total cargo capacity is 48,000 cubic feet or about 1000 tons. Vessel is Diesel powered by two Cooper Bessemer 8-cylinder engines. Speed is 15 knots loaded. Auxiliary electric power is furnished by two 150 kw - 440 v Caterpillar and one 30 kw 440 v General Motors generating sets.

Ice Company Expands

THE Lake City Ice & Coal Company, Michigan City, Ind., is completing an extensive expansion program which will make it one of the top ten ice producers in Indiana according to Ben H. Landing, president. The company has purchased the City Ice & Beverage Inc., La Porte, Ind.; completed an agreement for manufacturing ice for the Biederwolfe Ice Company, in Monticello and modernized its local ice plant. Truck icing stations also will be established at two points in the area for truckers.

Looking into AMMONIA Valves?

Check these important features which have established Wolf-Linde Ammonia Valves as the criterion of the industry since 1880



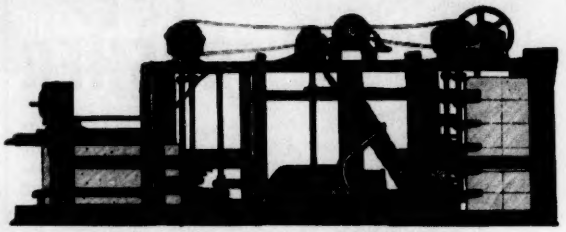
Standard valves made in globe, angle, and tee body styles. Expansion valves available in sizes 3/8", 1/2", and 3/4", IPS, in both globes and angles, screwed or flanged. Complete line of Ammonia Fittings offered for both standard and special applications. Your inquiry invited.

Write for WOLF-LINDE VALVES Catalog

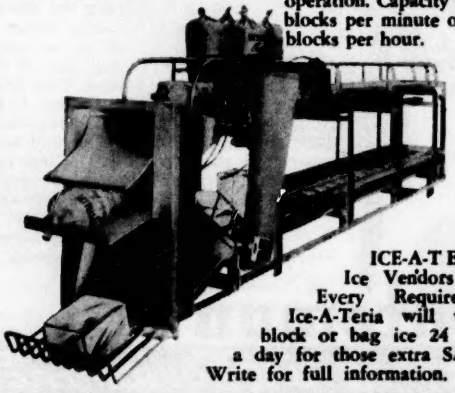
DERSCH, GESSWEIN & NEUERT, Inc.

4849 W. GRAND AVE., CHICAGO 39, ILLINOIS

PERFECTION SPECIAL



The PERFECTION SPECIAL receives ice blocks on edge, scores them lengthwise first. Then heads up the blocks, scores them crosswise and discharges them standing on end. This is a combined heading and scoring machine and scores the blocks into any size pieces desired in one complete operation. Capacity is 4½ blocks per minute or 270 blocks per hour.



ICE-A-TERIA Ice Vendors For Every Requirement. Ice-A-Teria will vend block or bag ice 24 hours a day for those extra SALES! Write for full information.

PERFECTION ICE SCORING MACHINE CO.
P.O. Box 2140, Fort Worth, Texas

DEATHS

Norman J. Kopmeier

THE death of Norman J. Kopmeier, president of the Wisconsin Ice & Coal Company, Milwaukee, Wis., for the last 31 years, occurred at the Shorewood Hospital Sanitarium after a long illness. He was 74.

Mr. Kopmeier's health began to fail in 1951. He suffered a stroke a year later. He recovered sufficiently to resume an active part in the direction of his business from his home. He was a leading Catholic layman and as a result of his work on behalf of Catholic charity he was named a Knight of St. Gregary the Great by Pope Pius XII in June 1948.

The firm which he headed is one of about ten in Milwaukee that are more than 100 years old and one of the few century old firms remaining in control of descendants of the founder. The company was established by his grandfather, John T. Kopmeier in 1849 as the Wisconsin Lakes Ice & Cartage Co.

Norman Kopmeier became president of the firm after the death of his father in 1923. He had joined the company 26 years previously starting as an ice route supervisor at the company's branch office on North 3rd Street. The job required him to start loading the ice wagons at 3:30 a.m. He did not finish until about 10:00 p.m., after the last man had completed his deliveries and had checked in.

When Mr. Kopmeier started with the firm in 1897 the emphasis was on cutting and retailing natural ice and on cartage services. The company cut ice on the Milwaukee River and nearby lakes and stored it in large ice houses for distribution during the summer months. During the years that Mr. Kopmeier was with the company the character of the business changed. The cutting of natural ice and cartage was discontinued, ice houses were abandoned and the manufacture of ice was begun. The company also entered the fuel business.

He was a past director of the Rotary Club and previously had been a member of the Milwaukee Country Club, University Club, the Wisconsin Club, the Athletic Club, the Oconomowoc Golf Club, the Sunset Club and the Skyline Club of Chicago. He took an active part in organization of the old Illinois-Wisconsin Ice Association and was a charter member of the National Association of Ice Industries.

Samuel (Lord) Vestey

THE death of Lord Vestey of London, England, known as Britain's "meat king" occurred May 5 at the age of 71. Lord Vestey inherited his father's interest in the cold storage and meat company, the Union International Company and other business holdings and, until his illness of a week, had put in a regular eight-hour day in his London office.

Lord Vestey's father, the first baron, created the family fortune with his brother, Sir Edmund Vestey. Together they created a family trust with headquarters in Paris from which their heirs reportedly drew about $2,800,000 a year. This arrangement enabled the Vestey family capital to escape almost free from Britain's death duties, in spite of challenges from Inland Revenue that was fought through the courts to the House of Lords.

The family coat of arms includes an iceberg, a bull, a sheep, a springbok and a row of three eggs to represent the interests in cold storage, shipping and meat packing of Lord Vestey's father who was created a baronet in 1913 and raised to the peerage in 1922.

Sir Samuel Vestey succeeded to his father's title in 1940. His only son was killed in World War II. Successor to the title now is his 13-year old grandson Samuel George Armstrong Vestey, a student at Eton secondary school.

J. B. Dinwiddie

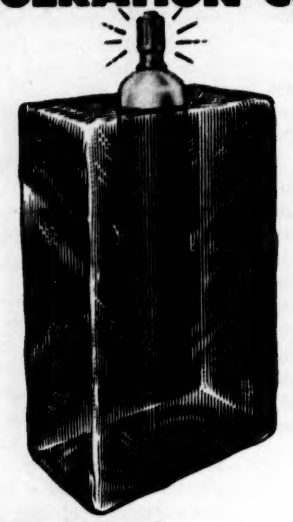
LONG identified with the ice industry in Atlanta, the death of James B. Dinwiddie occurred at his home in Atlanta, May 4. He was 65. Mr. Dinwiddie had retired as vice-president of the Atlanta company with which he had been connected more than 25 years, four years ago. Formerly he was with the old Consumer properties in Atlanta and for several years headed a local delivery company which at that time handled all Atlantic and Consumer production in the Atlanta market.

RUSSELL STOVER, widely known as the "Eskimo Pie King," died May 11 at his winter home in Miami Beach, Fla. at the age of 66. Mr. Stover developed and patented the Eskimo Pie in the early 1920's.

SAMUEL JACOB RAWLEY, former Plant operations manager of the Borden Company, Ice Cream Division, in Milwaukee, died April 20 in Miami, Ariz., where he had lived since January 1953 after retiring.

KOOLER KUBES
Trademark
50-lb. cubes of heavily compressed salt.
Dissolve evenly. Keep brine at constant Salometer strength.
Eliminate labor, guesswork, measuring, waste.
Uniform! Clean! Reduce icing of coils. Prevent clogged nozzles.
Try them today. Or, for information, write INTERNATIONAL SALT CO., INC. Scranton 2, Pa.
For Refrigeration with UNIT COOLERS or SPRAY DECKS

Freeze Out HIGH REFRIGERATION COSTS!



USE BARRETT® BRAND

Anhydrous Ammonia

GET: ● Lower Operating Costs!

● Outstanding Delivery Service!—high speed delivery! Cylinder stocks maintained at all our coast-to-coast distribution stations. There is one near you ready to fill your needs *promptly* and *regularly*. 150, 100 and 50-lb. cylinders.

● Outstanding Purity!—no free non-condensable gases to cut down efficiency, or other impurities to corrode equipment.

● Extremely Low Moisture!—doesn't freeze up expansion valves, corrode equipment or ice up in evaporators.

Operating costs are lower because you get more refrigeration per pound of Barrett Brand Anhydrous Ammonia than from a pound of any other type of refrigerant commonly used in food lockers, ice plants, cold storage and industrial cooling processes—all at a lower cost per pound for Ammonia. Order a trial shipment of 150, 100 or 50-lb. cylinders today!

GET THIS VALUABLE HELP!

☐ Please send your FREE Ammonia Leak Detector Kit. (Pocket size, this handy kit can be used over and over again.)

☐ Please have your specially trained Ammonia Technical Serviceman call, discuss the economical use, etc. of Anhydrous Ammonia. No obligation.

☐ Please send your valuable handbook, "Guide to use of Barrett Brand Cylinder Ammonia." (Shows most economical usage; contains chemical properties, handling, charts, etc.)

First In Ammonia Since 1890

NITROGEN DIVISION ALLIED CHEMICAL

NITROGEN DIVISION

ALLIED CHEMICAL & DYE CORPORATION

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Ground Cooling Used For Apple Warehouse

A NEW method of "ground cooling," by which pipes buried in the ground will carry cool air indoors is being installed in the Jim Whitbeck apple warehouse at Orondo, Wash. The project was directed by Art de Desrochers, East Wenatchee refrigeration engineer. The piping will be placed underground 30 inches deep in an orchard area adjacent to the Whitbeck warehouse.

Mr. deDesrochers explained that the ground cooling method follows the same basic idea as radiant house heating whereby heat is created at a boiler and the house is warmed when the heat is dissipated through the pipes under the rooms. In ground cooling, the heat in the warehouse will be picked up by the refrigerant and compressed but the heat will be dissipated in the cold ground.

deDesrochers explained that the ordinary methods for dissipating the heat are by air cooling, which involves a fan blowing against a radiator, and by water cooling, which involves spraying water over the pipes. The latter process involves a source of water and a source for getting rid of the water. These are drawbacks because in many orchard areas, one or more of these facilities are not available.

The ground cooling method, he went on, does away with fans in the case of air-cooling and with water and pumps in the case of water cooling. He said that while the original installation cost of the various methods was about the same, the ground-cooling method did away with maintenance costs as no pumping or fan operations are involved. Furthermore the danger of pump and water systems freezing in extreme cold weather is removed.

Freezing Plants For Fishing Boats

THE fish processing industry, which has come in for a number of shots in the arm during the past few years through development of new frozen specialities, is due for another major development in frozen fish processing techniques.

The Interior Department's Fish and Wildlife Service, following a five-year experimental program, has found that there would be distinct advantages to the fishing industry if fishing boats were equipped to freeze fish as soon as caught.

Hence, according to Arnie J. Suomela, assistant director of the Service seagoing deep-freezers may soon become commonplace.

Boats equipped with deep-freeze equipment, Mr. Suomela points out, would be able to stay out as long as necessary to catch a full cargo. Currently, the time a boat may remain at sea is limited, because iced fish must be brought to shore freezing plants before quality is affected.

With all boats returning with full loads, he comments, labor costs ashore would be reduced because a steady supply of fish would be available for processing. Processors frequently lose money today, he stresses, because they maintain full labor crews but may not always have fully-loaded fishing boats arriving with sufficient volume to keep them busy.

Mr. Suomela, who gave the survey's findings to the annual meeting of the National Fisheries Institute in Cleveland, also pointed out that the value of the catch would be enhanced, because many parts of the fish now thrown overboard during the cleaning for icing could be preserved for later utilization in by-products and pharmaceuticals.

Subscalding Poultry

SINCE subscalding has been widely adopted, experiments and experience with the method are receiving attention in publications and meetings. W. J. Stadelman and B. A. McLaren of State College of Washington, Pullman, report that the temperature of scald affects tenderness but the time of immersion in the scalding water is much more important. With shorter scald, they say, it is entirely possible to produce a more tender bird with the higher water temperature. They warn against the practice of giving thin, pin-feathered birds a longer time in the scalder. They also found some advantage in shortening the period between killing and scalding as much as possible.

The firm of Floden and Button, Modesto, Calif., has adopted subscalding and has brought the entire operation into one plant, so that they can impose controlled speed on the production of frozen subscalded poultry. Within 20 minutes after slaughter, the bird is in the cooling tank, where it spends four hours. Then 25 minutes later, it is undergoing fast freezing at minus 40 to 50 F.—TRRF Bulletin.

Frozen Foods Hold High Purity Standard

THE California Frozen Food industry has been called "an outstanding example of co-operative effort between a great new industry and public health authorities in upholding the highest standards of purity in food and safeguards to public health."

This praise was offered by Dr. J. C. Geiger, director of public health for the city of Oakland. He made the statement at a dinner given by the Frozen Food Distributors Association of California. He stressed that maintenance of correct low temperatures at all stages of handling from packer to retail store was most important.

Ship Frozen Baked Goods

THE Kitchens of Sara Lee, Inc., Chicago, bakers of a line of cake items, are now embarking on a program to broaden distribution by shipping the baked goods frozen to markets all over the United States. To launch the new frozen line, Sara Lee has appointed brokers for specific areas. Distribution of the frozen cake has been completed for Texas, Oklahoma, Atlanta, Georgia; Memphis, Tennessee; New Bedford, Mass. and Miami, Fla.

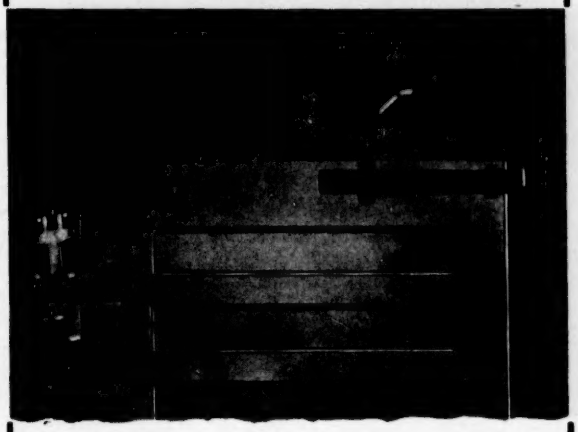
COMING CONVENTIONS

AMERICAN SOCIETY REFRIGERATING ENGINEERS
July 11-14, 1954
Olympic Hotel, Seattle, Wash.
M. C. TURPIN, Exec.-Secretary

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS
November 2-4, 1954
Roosevelt Hotel, New Orleans, La.
J. RICHARD KELAHAN, Secretary

NATIONAL ASSOCIATION ICE INDUSTRIES
November 9-12, 1954
Netherland Plaza Hotel, Cincinnati, Ohio
GUY W. JACOBS, Executive-Secretary

Prevent
COLD ROOM LOSS



with . . .
AIR-LEC DOOR OPERATORS

Air-Lec, shown installed above the cooler door, opens and closes the heaviest doors quickly, safely and smoothly at the touch of a switch or the light pull of a cord. Available with Mechanical Trip for one or two operating stations above each door approach, or with Electrical Switch for more and distant stations. Air-Lecs are in use in thousands of factories, food freezing and storage plants, meat packing companies, garages and service stations. Speed and Safety are characteristic of Air-Lec because Air-Inertia-Spring, all elastic forces, are the patented forces used.

AIR-LEC FOR TYPICAL COOLER DOOR. . **$65.00**

. . . AND AIR SEAL

Installed at left of door in illustration, the Air Seal operates in conjunction with Air-Lec, to provide an absolute seal on cooler doors. Air Seal crowds the outer edge of the door to stop improper circulation and frosting. Air Seal is especially desirable where temperatures below freezing are maintained.

AIR-SEAL. $25.00

NOTE HOW THEY RE-ORDERED AIR-LECS

	Recently Ordered	Now Enjoy
Williamson Storage & Ice Co. Williamson, N. Y.	1	4
Fisher Artificial Ice & Cold Storage Co. Dubuque, Iowa	2	6
Kraft Foods Co. Springfield, Mo.	1	25
Alford Refrigerated Warehouses Dallas, Texas	4	96
First National Stores, Inc. Somerville, Mass.	2	16

Fill in and return the coupon today for complete information.

SCHOELKOPF MFG. CO., Madison. Wis.
Cooler Doors are ___ Ft. Wide, ___ Ft. High. Air Pressue ___
Open Toward Warm Side, Cold Side.
Firm Name .....
Address .....
By .....

SCHOELKOPF MANUFACTURING CO.
312 N. THIRD ST., MADISON 4, WIS.

News of People

THOMAS L. CAUM, whose engineering company helped pioneer commercial refrigeration and air conditioning in the area of Altoona, Pa., during the past 20 years, was given a surprise party by the firm's employees. Mr. Caum, son of the founder of the former Caum Ice Cream Company, started working with refrigeration at the Caum plant in 1920. In 1934 he started repairing Frick refrigeration equipment. In 1944 the business was moved to the present location at 2513 Sixth Avenue. Since then he has installed air conditioning in a number of projects, including the first air conditioning in Altoona in the former cocktail lounge of the Penn Alto hotel.

ROY M. HAGEN, first president of TRRF, past president of Los Angeles Chamber of Commerce, has been honored by the Los Angeles Board of Supervisors for his contributions to greater employment and more business in his home city during his term as head of the Chamber.

DONALD E. HORTON, assistant executive secretary of the Merchandise Division of AWA for the last eight years, succeeds Wilson V. Little as executive secretary, whose retirement was announced in the June issue. Mr. Horton is well qualified for the new position. Before joining AWA he was secretary of the Illinois Association of Merchandise Warehousemen and first manager of the Federal Emergency Warehouse Association of Chicago. Allen D. WALTERS will become assistant executive secretary.

GARTH SHOEMAKER, Hygeia Refrigerating Co., Elmira, N. Y. has been appointed AWA National Councilor to the 42nd Annual Meeting of the Chamber of Commerce of the U. S. James W. Straub, Merchants Refrigerating Co., New York City has been appointed a delegate to the meeting, which will be held in Washington, D. C.,—Cold Facts.

CECIL H. RHODES has been appointed executive secretary of the Canadian Warehousemen's Association. Mr. Rhodes is from Vancouver, has lived in Ottawa, and is presently residing in Toronto where he has been associated with the Health League of Canada and the Canadian Restaurant Association.—NARW Cold Facts.

EDWIN T. GIBSON, for many years prominent in national food circles, has joined the board of directors of Market Research Corporation of America, New York. As a pioneer of the frozen foods industry, Mr. Gibson was recently named an honorary life member of the National Association of Frozen Food Packers of which he is a past president.

HARLAN J. NISSEN, Termina Refrigerating Co., Los Angeles, was a speaker and a moderator of a panel on "Standardization of Turkey Packaging and Marketing" at the recent 30th Annual Convention of the Pacific Dairy and Poultry Association.

J. M. SEABROOK has been elected president of the Seabrook Farms Co., Bridgeton, New Jersey, to succeed his father, Charles F. Seabrook, who becomes chairman of the board. The new president has been a vice-president and director of Seabrook Farms since 1941 and executive vice-president since 1950.

ELWIN R. SHORT, general auditor and assistant secretary-treasurer of National Ice and Cold Storage Co., San Francisco, Calif., has been elected Western region vice president of the Institute of Internal Audiors. Last year, Short served as president of the institute's San Francisco chapter.

Hertzler Resigns From York Succeeded by Serfass

THE resignation of John R. Hertzler as vice-president, director and general sales manager of York Corporation has been announced by Stewart E. Lauer, president. Roy K. Serfass, assistant general sales manager succeeds Hertzler as general sales manager.

A graduate of Lehigh University, Hertzler started with York in the company's course for college graduates. He served as a sales engineer until 1935 when he was made manager of the air conditioning division. In 1938 he was appointed general representative on sales, in 1940 general sales manager and in 1945 vice-president and general sales manager.

New Rail Ice Plant

A BUILDING permit for an ice manufacturing plant and storage room to be constructed at Kansas City, Kans., to serve Union Pacific tracks in Kansas City, Kans., has been issued. John McDermott, city building inspector, granted the Collins Construction company authority to erect a one-story structure at an estimated cost of $200,000.

Carbon Dioxide Wells In Salton Sea Abandoned

THE Salton sea, in Imperial county, Los Angeles, Calif., for at least 15 years California's main source of carbon dioxide gas, used in the manufacture of "dry ice", is being abandoned, according to a news report. Approximately a dozen wells, the last of a considerable number, upon which the Cardox Co. of Los Angeles built a substantial business, will be abandoned if engineers can reach them in boats to perform the necessary abandonment duties.

The Cardox Co. is not going out of business. It simply has made connections with a more convenient and economical supply of dry ice. Some time ago it entered into a ten-year contract with Shell Chemical Co. to take the output of a new ammonium plant that Shell built to take by products from its wells in the Ventura avenue field.

Since Cardox began developing a natural supply of carbon dioxide gas in the Salton sea long strides have been made in the manufacture of "dry ice". The supply has even kept ahead of the demand, although new uses for it are being constantly developed.

The brewery industry in all parts of the country produces material readily converted into dry ice. Union Oil has a large dry plant at Santa Maria and is currently building another in the Brea field.

The Imperial county supply was developed by drilling comparatively shallow holes into the mud geyser area of Salton sea to tap the gas which was led through a succession of gathering lines to a compressor where it was changed from hot to cold, made into sizable blocks of dry ice, and sawed into slabs to serve many commercial purposes.

Hereabout it was used in fire apparatus at the various airports, and employed to cool and repressure passenger planes. One of its chief uses was as a refrigerant in the ice cream and dairy business, as well as in long-distance transportation of fresh meats.

The Salton sea's dry ice industry was often a little short of commercial requirements and its death may be attributed to drowning. During a long series of years the depth of the sea has steadily increased until now it is eight feet or so above normal, and the end is not yet in sight. This increase is attributed to the deposition of irrigation water from the All American canal into the natural reservoir.

MANUFACTURERS' NEWS

Servel Increases Water Chiller Production

PRODUCTION of heavy-duty water chillers, already increased over last year's rate, has now been doubled again by Servel, Inc., Evansville, Ind. H. R. Nielsen, manager of Servel's air conditioning division, announced that the development of new uses for chilled water and the increased demand for this equipment had made it necessary to step up the company's output by 100 percent over the original schedule for 1954. This original schedule already represented an increase over 1953, Servel's best year for air conditioning sales.

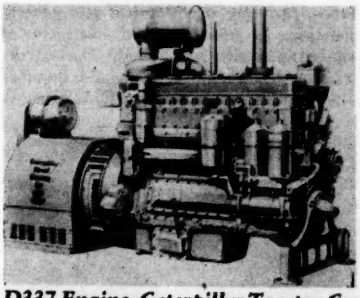
The Servel water chiller is an absorption-type unit that uses steam from any source to produce chilled water for air conditioning or industrial processing. It has a capacity of 25 tons of refrigeration. This water chiller has no moving parts in its absorption refrigerating system. Its electric power requirement is a standard 115-volt line to operate the controls.

Because the unit is light in weight and free from vibration, it may be installed on any floor from the basement to the penthouse. It is so compact that it will pass through an ordinary door.

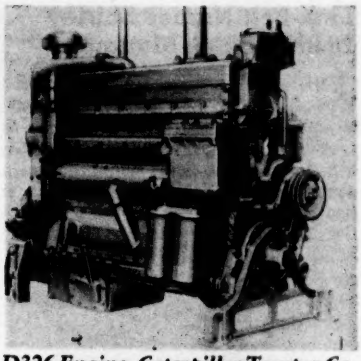
New Higher Rating For Engines and Electric Sets

NEW higher rpm. continuous ratings for Cat D337 and D326 engines and electric sets in both self- and externally-regulated types have been announced by Caterpillar Tractor Co., Peoria, Ill. These engines are now available for continuous operation 24 hours a day at 1800 rpm.

Continuous duty is now available at 1800 rpm. for externally-regulated D337 Electric sets at an output of 110 Kw and for externally regulated D326 Electric Sets at an output of 85 Kw. Similar operation for self- regulated electric sets is available at an output of 103 Kw for D337 electric sets and 80 Kw for D326 Electric sets.



D337 Engine, Caterpillar Tractor Co.



D326 Engine, Caterpillar Tractor Co.

Under the ratings an output of 162 Bhp from D337 Engines and 118 Bhp from D326 Engines is now attainable for continuous operation at 1800 rpm. New outputs for continuous service generally not exceeding an average of 12 hours per day were also released for these engines and electric sets. Continuous 12 hour service is now available at 1800 rpm. for D337 Engines at an output of 182 Bhp and an output of 134 Bhp for D326 Engines.

For 12 hour duty under the new ratings externally-regulated D337 Electric Sets have an output of 124 Kw at 1800 rpm. and externally-regulated D326 Electric Sets an output of 95 Kw available at 1800 rpm.

S&S ICE VENDING STATIONS
and Ice Vending Equipment

AUTOMATIC!
REFRIGERATED!
DEPENDABLE!

S&S Frozen Food & Ice Cream STORAGE DEPOTS

For Independent, Outside Refrigerated Storage! . . . Complete Ready to Plug In! Portable!

Slash distribution costs . . . add frozen food profits for chain stores and super-markets!

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PIPE BENDING EXPERTS

Nearly a half-century of "know-how" and workmanship go into every job turned out by our master metal-workers. You may confidently entrust your work to us, even stainless steel, and other metal up to 6-inch extra heavy. We have complete modern metal working equipment, including all-around welding facilities.

May we quote on your next job?

CHICAGO NIPPLE MFG. CO.
1997 CLYBOURN AVE., CHICAGO 14, ILL.

Link-Belt Names Shirley District Sales Manager

THE appointment of Donald L. Shirley as district sales manager for the Seattle, Washington, area has been announced by Link Belt Company. His headquarters will be at the company's Seattle plant, 3405 Sixth Avenue, South.

Donald L. Shirley

Mr. Shirley had previously served with Link-Belt from 1914 to 1944. He started in the Seattle office and later was transferred to the company's chain plant in Indianapolis. After serving in sales at the Philadelphia and Seattle offices, he was appointed manager of the Portland office. J. F. Strott is general manager of the Northwest Pacific Division, which includes sales offices in Spokane and Portland in addition to Seattle.

Vending Installations

THE following ice companies have recently installed S & S Vending Stations:

Shoshoni Ice Company, Shoshoni, Wyoming.
Peoples Ice Company, Lawton, Okla.
Wachs Ice & Fuel, Willoughby, Ohio.
Ice Delivery Company, Toledo, Ohio.
Simanks Ice Company, Stillwater, Okla.
Karp Coal & Ice Co., Detroit, Mich.
J. B. Service Company, Seattle, Wash.
Atlantic Ice Company, Downingtown, Pa.
Atlantic Ice Company, Morrisville, Pa.
Langston Ice & Fuel, Society Hill, S. C.
Builders Supply Co., Lancaster, S. C.
Crystal Ice Company, Norwalk, Conn.
Polar Ice Company, Las Vegas, Nevada.
Bryan Ice Service, Bryan, Texas.
Birn Baum & Girdino, Berlin, Conn.

Jamison Appoints Parker Atlanta Representive

JOHN W. PARKER and Associates, 815 Bona Allen Bldg., 133 Luckie St., N.W., Atlanta, Ga., has been appointed sales representative for the Jamison Cold Storage Door Company, Hagerstown, Md. The Parker firm will represent Jamison in Georgia, Florida, Alabama, Mississippi, Louisiana, Tennessee, South Carolina and the southeastern part of North Carolina. The company has years of experience in the refrigeration field working with architects, contractors and insulators.

Ammonia Production Expanded By 50,000 Tons

EXPANSION of its nitrogen plant at Hopewell, Virginia to increase production of anhydrous ammonia by 50,000 tons per year has been announced by Nitrogen Division, Allied Chemical & Dye Corp.

Ammonia capacity of the Hopewell plant was increased last year. The new project, involving changes in equipment and installation of some new facilities, will further expand ammonia capacity, as well as capacity for converting ammonia to nitrogen solutions, and will enable the Division to supply the requirements of its customers in the area served by the Hopewell plant.

Hy Jarvis New Head of Recold

REFRIGERATION Engineering, Inc., Los Angeles has elected H. T. (Hy) Jarvis, formerly vice-president and general manager, as president and chairman of the board of directors. D. D. (Dan) Wile, formerly chief engineer of Recold, becomes vice-president and a director. E. V. (Ernie)

H. T. Jarvis *D. D. Wile*

Jarvis has been elected secretary-treasurer and a Director to complete the top management group.

Under the new organization Mr. Jarvis will continue the direction of sales and sales promotion; Wile continues in charge of research and engineering; Ernie Jarvis assumes charge of manufacturing.

Henry Valve Appoints New Representatives

AS AN additional service to their customers, four firms, which represent the Henry Valve Company in various sections of the country, have established new warehouses and are carrying their own large stocks of assorted Henry products for emergency shipments. These stocks will now allow the wholesalers and manufacturers in each area to secure quick, efficient delivery of Henry items for their small individual requirements where time will not permit shipment from the factory.

These companies are: Boyd-White Company, 160 Pine St., N. E., Atlanta 5, Georgia; The Marshall Company, 2801 Walnut St., Denver 5, Colorado; Milmac, 144 Townsend St., San Francisco 7, California and Northwest Factors, 2932 First Avenue, Seattle 1, Washington.

In addition to the above firms, warehouse stocks of Henry products have been maintained for the past several years by the Richard S. Dawson Co., 228 Glendale Blvd., Los Angeles 26, Calif.

New Trane Laboratory Special Preview

A SPECIAL preview of the new Trane Research and Testing Laboratory was held in LaCrosse, Wisconsin, May 20. This new laboratory used primarily for heating and air conditioning research was formally dedicated the week of May 16. The special preview was held for trade publications and newspapers. In addition to the well equipped laboratory there was a display of refrigerated cars and trucks.

One of the important events was a speech by Robert LeBaron, president Eisenhower's top military adviser on atomic energy in which he advocated an all-out program for the United States to speed development of the atom for peacetime use. In all atomic energy work, he said, there is a common denominator of heat transfer.

In the laboratory, temperature in any part of the world can be duplicated in order to pre-test air conditioning, heating, ventilating or heat transfer equipment for use anywhere from the Arctic regions to Equator. Among research and testing facilities the guests saw operating were the cold rooms, in one of which temperature can be driven to as low as 65 degrees below zero; an unusual "room-within-a-room" where the outside of the inner chamber can be refrigerated to test heating equipment on the inside, or adapted for heating the outside to test air conditioners inside; and batteries of air tunnels which were testing equipment that ranged from a new unit ventilator for schoolrooms to special coolers for radar tubes and jet plane cockpits.

In connection with atomic energy, displays diagrammed the principles of

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Industrial Power Plants
Refrigeration and
Cold Storage Warehouses,
Reports, Appraisals and Management

harnessing atom power to heat buildings or even to power an airplane. Nearby was exhibited an atmosphere-controlled furnace capable of producing temperatures up to 2,500 degrees above zero. Here Trane has been developing methods of manufacturing special types of heat exchangers which will work efficiently under the ever-climbing temperatures of new industrial processes.

CATALOGS AND BULLETINS

New Bulletin on Electric Control Centers

A NEW bulletin, F 5265-1, giving complete information on Barber-Colman Electric "Control Centers", is now available.

How to improve the installation of controls for heating, ventilating, and air conditioning with automatic electric "Control Centers" is clearly explained. This new bulletin points out how everyone all along the line, from the property owner to the engineer and electrician, can benefit from a centralized "Control Center" system.

With this system, the engineer can prepare adequate specifications in a minimum amount of time. Complete, easy-to-understand specifications allow the contractor to prepare an exact bid which may reflect a lower cost, because he knows the correct amount of material required. The electrical contractor, following specifications, can install "Control Center" wiring faster and easier without profit-eating unknowns cropping up.

Customer satisfaction and reduced service requirements are the result of using the neat, easy-to-check Barber-Colman "Control Centers" and Electric Automatic Controls, as explained.

Cooling Tower Catalog

A NEW Commercial Cooling Tower Catalog, containing new material on air-conditioning cooling tower applications, specifications, selection and installation is offered by Halstead & Mitchell, Pittsburgh, Pa. These H & M Cooling Towers, it is stated, save over 95 per cent of the cooling water which would be normally (and expensively) wasted to the sewer. The 16-page Catalog, WT & CT-583, describes the operating characteristics of twenty standard Halstead & Mitchell Commercial Cooling Towers, ranging in capacity from five through sixty tons. Several pages are devoted to tables, drawings and graphs.

Information covered includes a comprehensive table of cooling tower nominal ratings for both 78 and 75F wet bulb temperatures, outlet water temperature plotted against wet bulb temperature, tower capacity plotted against wet bulb temperature, layouts for year-'round operation and inside use, and much additional data. The catalog describes in detail the basis of Halstead & Mitchell's exclusive 20-Year Guarantee on the wetted deck surface against attack by rotting or fungus growth, and also discusses the vinsynite, vinyl zinc and chlorinated rubber coatings which are applied to the tower cabinet for protection against corrosion. Cutaway views and line drawings detail mechanical features of the cooling tower construction.

Atkomatic Offers New High Pressure Bulletin

NEW literature available in the form of a 4-page bulletin on solenoid valves for high pressure applications is offered by Atkomatic Valve Company, Indianapolis, Ind. Literature illustrates features of Atkomatic Bronze or Stainless Steel High Pressure pilot operated and direct lift Solenoid Valves with diagrams of electrical circuits used for normally open and normally closed operations. Atkomatic offers a line of high pressure valves to 5,000 P.S.I.

Classified Advertising

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for USED equipment.

RATES: 20c per word; minimum 25 words. $2.00 per line for bold face headings. $15.00 per inch for line listings.

FOR SALE—Two good shell and tube condensers twelve inch by eighteen feet long, thirty tons refrigeration. Write C. B. Page, Manager, Diamond Ice Company, Perry, Okla.

FOR SALE—10"x7" Worthington booster. 15 ton Acme shell and tube condenser. 4x4, 5x5 Fricks. 3x3, 7½x7½, 8x8, 9x9 Yorks, splash lubrication. Write E. Niebling, 1546 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

For Sale—One Buckeye Diesel 112 h.p., 400 r.p.m., 3 cylinder, 9¼ x 14. One generator 70 K.V.A. Westinghouse; one Superior Diesel 65 h.p., 500 r.p.m., 4 cylinder 7 x 9. One Graver water softener 21 gal. per minute. All in good condition; make us an offer. Contact Earl Gibson, Gibson Arena, Muncie, Ind.

FOR SALE — COMPLETE ICE PLANTS
20 tons to 150 tons.
AMMONIA COMPRESSORS
12½x14½ York — capacity control.
10x10 York — 100 h.p.
9x9 York — 75 h.p.
9x9 Frick — V belt drive.
7x7 Frick — V belt drive.
7½x7½ York — Model D8.
4x4 self contained unit.
MISCELLANEOUS EQUIPMENT
130 h.p. Diesel Engine with 109 KVA generator.
75 h.p. 300 r.p.m. synchonous motor.
3 h.p. & 10 h.p. low pressure blowers.
Brine coolers, ice tiering machines, ice cans, etc.
JOHN F. CARSON
"A" & Venango Sts. Philadelphia 34, Pa.
Phone GArfield 6-2221

FOR SALE
3—10x10 Frick ammonia compressors.
1—46"x14' Vertical shell & tube condenser.
2—34"x14' single pass shell & tube brine coolers.
600—11"x22x51" ice cans.
1—24"x17' ammonia receiver.
2—Allen Billmyer low pressure blowers.
1—3½ ton Euclid cane.
Assorted ammonia fittings of all kind.
We will service and erect plants anywhere.
DAVID BERNARD REFRIGERATING SERVICE CO.
72 Broadway Ave. North Irwin, Pa.

FOR SALE—York and Frick 9 x 9, Vilter 9½ x 9½, and 10½ x 10½, all high speed; 9 x 9 slow speed, Baker 4½ x 4½. Cranes, can fillers, condensers, brine coolers, cans, agitators, blowers. 15 ton ice plant, Diesels. Parke Pettegrew, 370 West Broad St., Columbus 8, Ohio.

FOR SALE—7x7 Sterling high speed compressor with 30 h.p. Westinghouse motor and automatic starter with Acme evaporative condenser Model AP-60 with receiver and complete with automatic controls, gauges, valves and fittings — all good as new. Also, almost new Hammer bag tieing machine. Ice Service Corp., Vincennes, Indiana.

FOR SALE—York ammonia equipment, used only two years, in storage at our plant; one 10x10 VSA-150 h.p. induction motor. Two 9x9 VSA-100 h.p. induction motors. One 4x4 VSA-10 h.p. motor. 38x16 condenser; 30x16 receiver; 8 plate sweet water cooler; two DER150A (20 ton ice capacity) Flakice machines; oil traps, miscellaneous valves, coils. Write P.O. Box 71, Champaign, Ill.

FOR SALE
Used Ice Plants and Refrigerating Equipment
20 ton Ice Plant 240—300 lb. Ice Cans—4 can pull—Electric Driven
50 ton Ice Plant 616—300 lb. Ice Cans—7 can pull—Electric Driven
85 ton Ice Plant 1040—300 lb. Ice Cans—26 can pull—Diesel Driven
AMMONIA COMPRESSORS
6x6 York Y-26 6x6 York Y-28
6½x6½ York Y-28 6½x6½ York Y-38
7x7 Frick type H 7½x7½ York Y-15
8x8 York Y-26 8x8 York Y-28
10x10 York Y-28 12½x12½ York Y-26
9x9 Frick type H capacity control D.C. 100 HP 360 RPM Syn. Motor
9x9 York Y-28 capacity control D.C. 100 HP 300 RPM Syn. Motor
10x10 York Y-16 100 HP 200 RPM Syn. Motor
10x10 York Y-16 70 HP 180 RPM Syn. Motor
10x10 York Y-28 100 HP 300 RPM Syn. Motor
12½x14½ York Y-28 D.C. 200 HP 257 RPM Syn. Motor
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2—3-cylinder Wolverine Diesel Engines 9¼x14 115 HP 400 RPM
1—4-cylinder Wolverine Diesel Engine 9¼ x14 135 HP 360 RPM
belted to an Ideal 50 KW 62.5 KVA 1200 RPM DC Generator 1.5 KW
Shell & Tube Ammonia Condensers, Brine Coolers, Receivers, Traps; Valve & Fittings.
1—Miller Perfection Ice Scoring Machine
1—Link Belt Slinger with extra hoses—5 HP Motor
1—Gifford Wood Crusher—2 HP Motor
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77-79 Alexander St. Yonkers 8-8118-9
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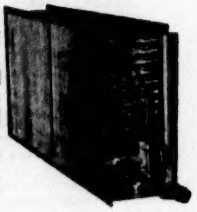

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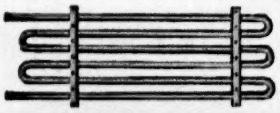

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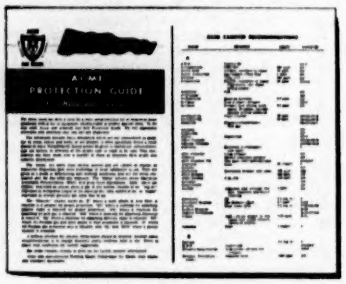

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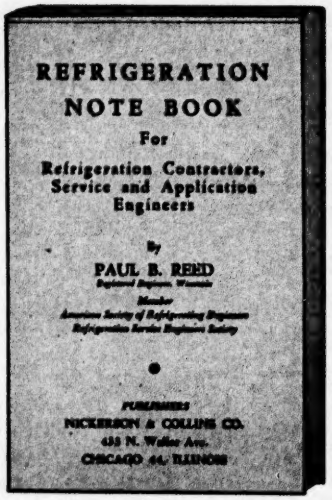

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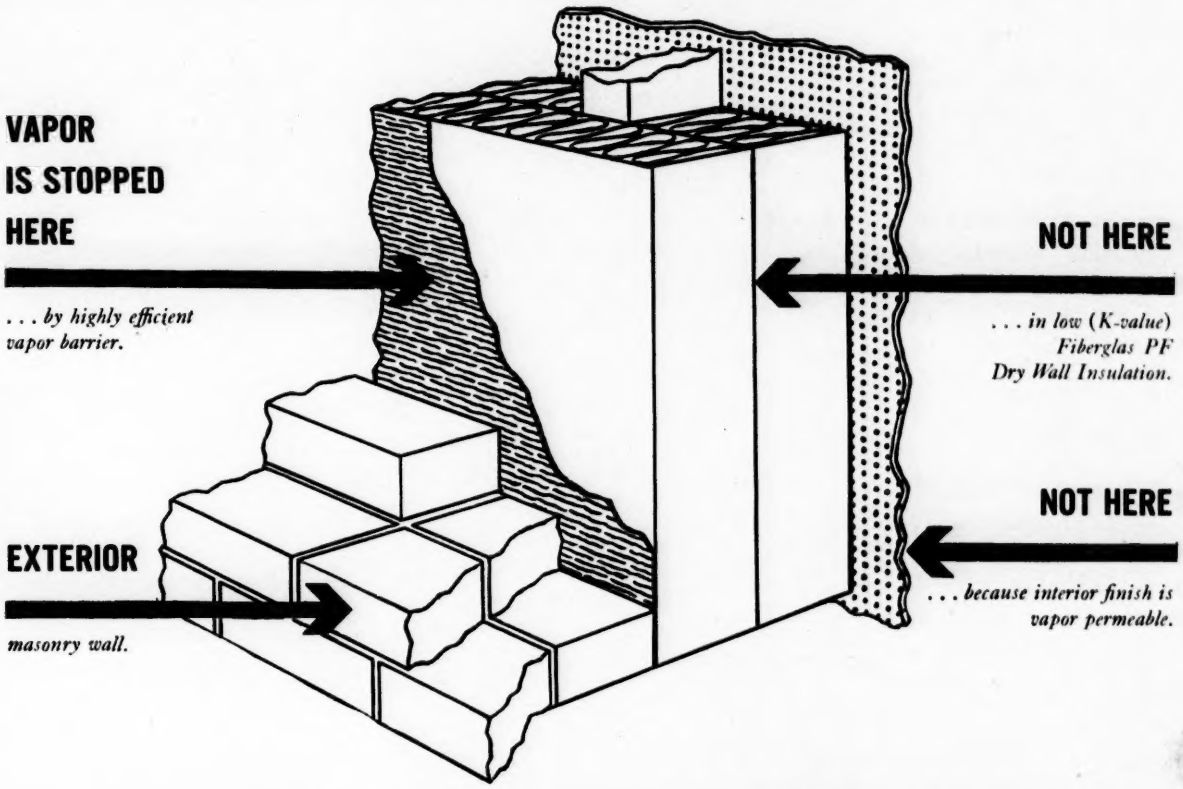

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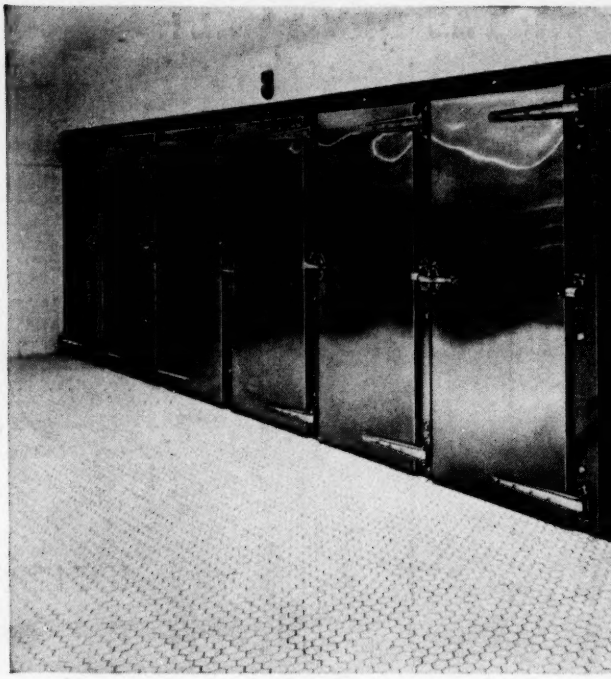

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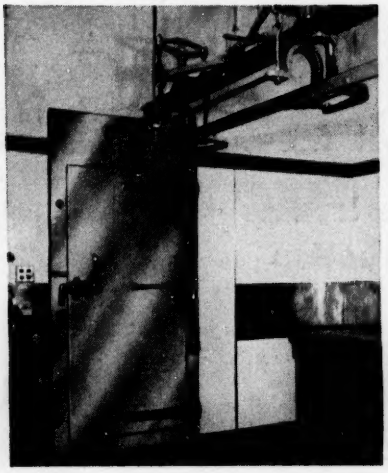

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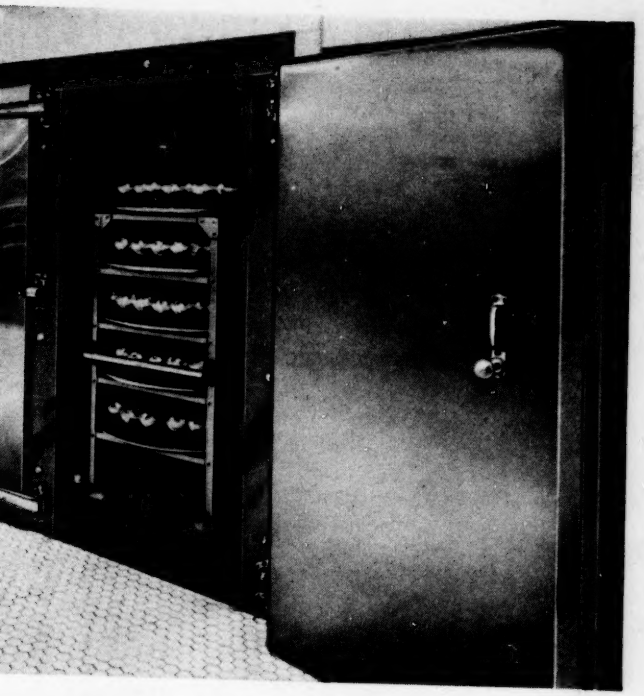

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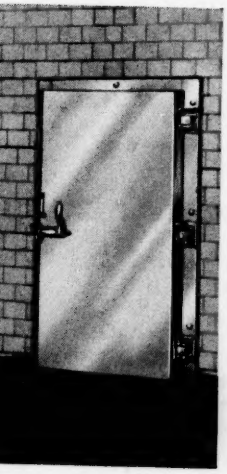

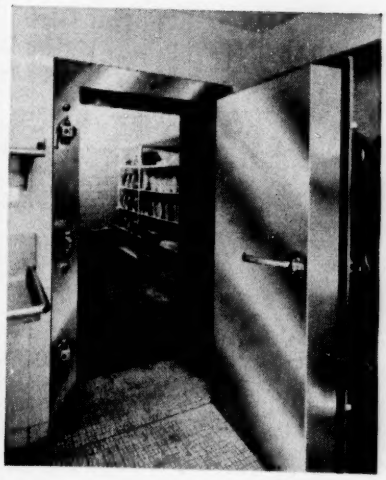

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